# Marine Review

SHIP OPERATION SHIPBUILDING CARGO HANDLING

**The National Publication Covering the Business of Transportation by Water**

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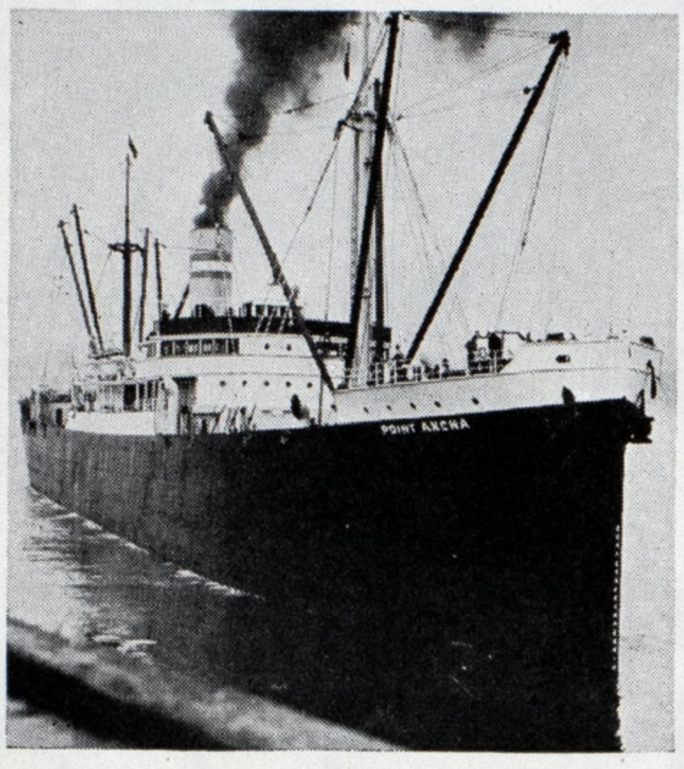



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# Marine Review

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SHIP OPERATION - SHIPBUILDING - CARGO HANDLING

Volume 65 March, 1935 Number 3


## Propose Single System for Panama Canal Tolls

LEGISLATION is now pending in congress providing a single system of admeasurement of vessels, using the Panama canal rules, as a basis for assessing tolls for transitting the canal. This legislation is generally opposed by American shipowners because it is believed that the amount of tolls so assessed will be materially higher than under the present dual system.

Under the dual system United States registered tonnage is also used as a basis of measurement in accordance with the provision of the existing law, which requires that the tolls paid by a vessel for transit of the canal, based on Panama canal rules, shall not be greater than the product of the cost per ton and the United States net registered tonnage.

It is a matter of serious concern, especially in the present circumstances that shipping should not be burdened with extra cost. There can be no reasonable disagreement, however, on any grounds of logic convenience, and safety as to the wisdom of discarding the existing pernicious system of dual classification. A single system would be preferable in every way. It would do away with the subterfuges that now must be used to reduce tonnage. It is merely a legal way of evading the real intent of the rules and is vicious, unsatisfactory and absurd. It would be far better if the ship were allowed to remain as properly designed and built and the spaces deliberately exempted from measurement.

As a matter of fact there need be no increase, except in obviously unfair instances, if the rate per ton is sufficiently reduced. There is no reason whatsoever to place the responsible officers of the government, the secretary of war, who makes the recommendation of the rate to be fixed per ton and the President of the United States who approves the rate, in a position inimical to the interests of the merchant marine.

The article in this issue on Panama canal tolls by the governor of the Canal Zone makes it perfectly clear that there is no disposition on the part of the canal authorities to advocate a system of assessing tolls which would be more burdensome financially on American shipping. It is pointed out that a rate of not over 90 cents per ton would be recommended and that an analysis of all the tolls paid on American ships transitting the canal in the last fiscal year worked out at the rate of 87 cents per ton. Also that a modification of the Panama canal rules of measurement can be made to remove any existing disparity in certain classes of vessels where found necessary.

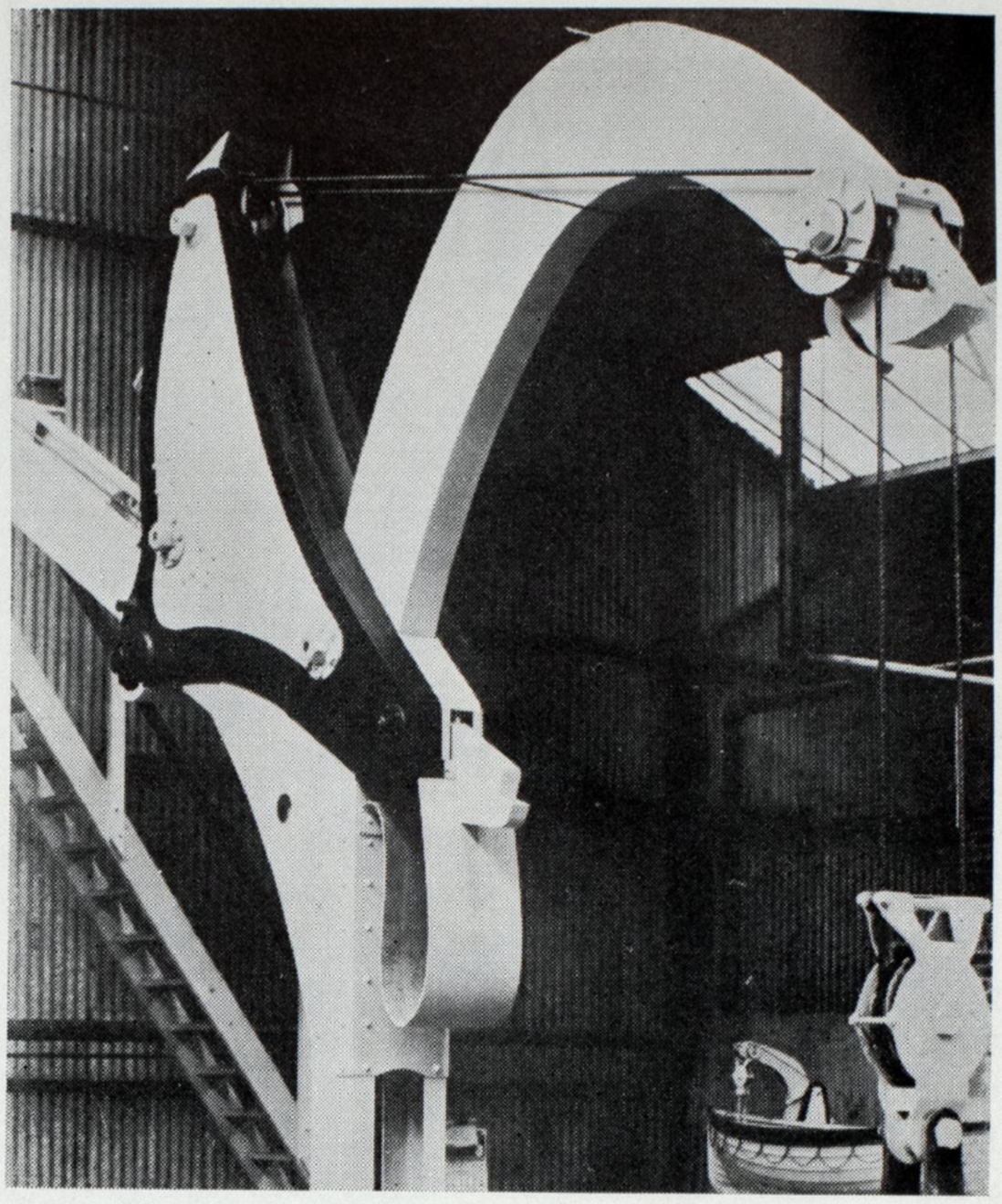
We are convinced that opposition to a single system of measurement is not the logical or reasonable approach to the solution of this problem. Additional expense to shipping must be avoided and the present returns in tolls are sufficient to provide for operation, upkeep and depreciation, with due consideration to the military uses of this waterway which cannot rightly be charged to the mercantile marine. Consequently the charges per ton and amendment of the rules, where necessary, are the real factors in any reasonable difference of opinion and these are subject to adjustment in such a way that there can be no unjustifiable increase in the cost of transitting the canal. Such a method will be fair to all.

The Panama canal rules are the logical standards for assessing the tolls. They represent a thorough survey and study of vessel measurement. They embody the experience of the past. By adopting a single system, using these rules, endless controversy and continual inconvenience are forever eliminated.

Keeping these rules as the basis, with whatever amendments may be necessary to suit present day standards and types of ships, and an agreed upon fair charge per ton, will bring about a solution once for all of this controversial subject which will be satisfactory to all fair-minded men.

# Lifeboats and Davits for Liner Queen Mary

BY "LANYARD"



*Testing Gravity Davit for Liner Queen Mary*

THE boatage of the mammoth British liner QUEEN MARY which is expected to enter the transatlantic service between Southampton, Cherbourg and New York in the early part of the 1936 season, will consist of 24 motor lifeboats carried in 24 sets of gravity davits—12 on each side.

Twenty-two of the boats will be of the following dimensions;—36 feet by 12 feet by 5 feet, while the other two, which will be known as emergency boats, will measure 30 feet by 9 feet by 4 feet.

Built of steel and fitted with copper buoyancy tanks, these lifeboats will be fireproof and un-sinkable. The largest boats will be capable of carrying 145 persons and the smaller ones 130 persons. They will be the largest ship's lifeboats ever turned out of a British yard. The largest boats on the MAJESTIC or BERENGARIA, originally the BISMARK and IMPERATOR and built in Germany carry only 72 persons. Side decks, 14 inches wide are fitted level with the gunwale (inside) to give passengers easy access to the boat and afford them protection in case of heavy bumping alongside.

Two of the boats will carry the latest type of radio installation and high powered searchlights, and all the boats will carry the usual gear such as oars, sea anchors, lamps etc. When fully loaded, the larger boats will weigh approximately 15 tons, and the smaller, 13 tons.

Their strength may be gaged from an actual test which reveals that a temporary deflection of the keel of ⅛-inch in the 36 feet length, is all that results from an overload of 25 per cent when the boat is hung up in the davits.

Each boat will be fitted with an 18 horsepower diesel engine, giving them a speed of 9 knots in smooth water. The engine will be enclosed in a watertight casing, and with the boat completely flooded, it can be started up and will run steadily until the oil fuel is exhausted. A carefully arranged, closed water circulating system inside the specially insulated casing, which can be electrically heated, will ensure the motor starting up in the most extreme conditions of cold and will also enable the motors to be run while the boat is on the chocks or being lowered into the water. Each boat will have two hand bilge pumps. They will be fitted with "Fergusons" patent releasing gear by means of which a lever aft can be pulled to let go both ends simultaneously at the opportune moment.

The boat deck will be over 100 feet above water and the boats will be carried in Taylor patent gravity davits of British invention and build. In their stowed position the boats will be completely clear of the passenger deck, their lifting hooks engaged with double steel wire rope lowering tackle and their keels snugly housed on stiff supporting members. In an emergency one man can release and lower the boat to the embarking position in the space of little more than a minute—less time than the average passenger would take to put on a lifebelt.

At the embarking positions the lifeboats will be automatically bowsed in to the ship's side making it an easy matter for passengers to be passed into them, after which they can be quickly lowered away. Each pair of davits has its own individual winch, electrically driven for hoisting purposes. Ingenious precautions have been adopted to prevent ice interfering with the davit gears, and to safeguard passengers from inconvenience from lubricating grease.

*One of the 145-person motor lifeboats for the liner Queen Mary. Built by Hugh McLean & Sons Ltd., Glasgow*

# STEAM TURBINE

## Geared Installations for Tramp Steamers

BY S. S. COOK*

THE rotating screw propeller is the best instrument so far evolved for the propulsion of a large ship through the water, and the problem of ship propulsion is one of imparting rotary motion to a screw propeller in the most efficient and reliable manner, efficiency and reliability being both understood in their broadest significance. A uniform rotary motion being therefore required for the propeller, an engine of the purely rotary type like the steam turbine appears to be the most appropriate for driving it. Before the advent of the steam turbine, however, the reciprocating steam engine was for many years the only prime mover available, and thus it comes about that the present generation is thoroughly familiar both with the idea and with the technique of the conversion of a reciprocating motion into a rotary one. It is interesting to speculate what might have been our attitude towards this question if the steam turbine, or some other form of rotary engine, had been invented first.

### Rotary Drive Preferable

Apart from such general considerations there are good economic and other reasons for holding it preferable to have a rotary drive for a rotary propeller. One most important consideration is the avoidance of propeller racing. It is a commonplace experience that under average voyage conditions absence of propeller racing is a valuable asset to a turbine driven ship inasmuch as it enables it to maintain its speed in a heavy sea. Considerable advantage in this respect has been claimed for those systems in which exhaust steam turbines have been added to reciprocating engines, from the pronounced steadying effect of the turbine observed in such installations, an advantage which most obviously belongs in still greater degree to an all-turbine drive. Moreover propeller racing must inevitably be accompanied by actual loss of power, making it necessary to develop a larger shaft horsepower to maintain the same speed.

Even under normal weather conditions, want of uniformity of rotational velocity of the propeller must have this effect to a greater or less degree. There is here a factor to the advantage of a turbine driven ship, for which however in the usual methods of estimating performance the ship receives all the credit in the form of an increased coefficient. To obtain the relation between the shaft horsepower of the ship when driven by turbines and the indicated horsepower when driven by reciprocating engines, comparison should be made between two sister ships each fitted with one of these types of engine and run at the same speed under identical conditions, steaming, for example, side by side. Such an experiment was actually carried out with two steamers belonging to the Cairn line in 1913, the S. S. CAIRNGOWAN with reciprocating engines and the S. S CAIRNROSS with geared turbines, and the results were given in a paper by C. Waldie Cairns, under whose supervision the trials were conducted. This interesting experiment showed that the shaft horsepower of the turbine driven ship was 87.7 per cent of the indicated horsepower of the reciprocating engine of the other ship.

### Uniform Turning Moment

The uniform velocity and uniform turning moment of a steam turbine also result in freedom from vibration and absence of noise, which although perhaps not so important in themselves for a tramp steamer as for a passenger carrying ship, must be conducive to general efficiency and reduce wear and tear. The absence of cyclic variations of temperature of the cylinder walls is a factor of the same degree of importance.

With the reciprocating engine in converting the reciprocating motion into a rotary one, one direction of rotation is as good as another, and this appears at first glance to give to that type of engine a superiority as regards reversal of the direction of rotation of the propeller shaft, a change of sequence of valve operation being all that is necessary for the purpose.

With a steam turbine the only practical solution of the reversing problem so far evolved is an additional turbine with blades of the opposite hand. In spite of this the turbine system consisting of an ahead turbine and an astern turbine, to either of which steam can be admitted at will, provides the best arrangement yet devised for maneuvering a ship. Full steam can be admitted to the astern turbine and operate on the blading of the whole turbine at all speeds—even when running in the ahead direction. In a reciprocating steam engine put astern, steam does not get through to the intermediate and low pressure cylinders until the engine has actually reversed, and even when reverse motion has commenced the quantity of steam admitted is only proportional to the speed. In view of this characteristic difference in operation, the maximum astern power which it is possible to develop when running full speed astern is no criterion of the stopping power.

The stopping force developed by the reciprocating engine in the early stages of reversal is only equivalent to about one-third of the full ahead torque, whereas the turbine can immediately develop a force astern equivalent to more than the full ahead torque, in fact, about twice that torque if necessary. During this part of the act of stopping, the energy of the ship's motion, propeller shaft and machinery is being absorbed by the steam in the form of heat, the steam admitted to the astern turbine when the ship is running in the ahead direction acting as a powerful brake, and the heat energy so absorbed passes over into the condenser, which with its circulating water is provided for the absorption of heat to the extent of four or five times the power of the machinery.

### Lubrication and Friction Losses

In a reciprocating engine, the piston rings require lubrication, especially so when superheat is employed. With a turbine the losses due to mechanical friction are small and such friction is entirely external to the turbine. Within the turbine the fixed and moving parts are not in contact. This carries with it the important practical advantage that, no internal lubrication being required, it is possible to maintain the boiler feed water free from grease. There is also no appreciable consumption of lubricating oil, the same oil circulated and cooled sufficing over a long period of service.

Because of the absence of internal lubrication there is no difficulty with a turbine in operating on the highest degree of superheat the boilers can supply, and the materials will stand.

In general, however, it has been the superior efficiency of the turbine

*Paper presented by S. S. Cook, F. R. S. (member), before the Institute of Marine Engineers, at London, Nov. 13, 1934. Reprinted practically in full with slight changes necessitated by the omission of the eight illustrations which accompanied the paper as published in the December, 1934, issue of the transactions of the Institute.

that has brought it into such extensive use, and as is well known its ability to utilize a high vacuum gave it considerable advantage in this respect over the reciprocating steam engine. At the present time with the assistance of mechanical gearing to reconcile the high speed suitable for the turbine with the low speed of revolution suitable for a ship's propeller it is applicable to practically all classes of mercantile propulsion.

It made its entry into the field of cargo boat propulsion with the famous experiment carried out in 1910 in the steamer VESPASIAN, the reciprocating engines of which were taken out and replaced by geared turbines. The VESPASIAN'S gearing was single reduction with a ratio of 20 to 1 between the speeds of the turbine and the propeller shaft, a ratio which was found to be not quite high enough for cargo boats to reap the full benefit of turbine propulsion. The natural immediate development to double reduction was however interfered with by the war period and the depression in mercantile building which followed it.

### Double Reduction Gearing

The use of double reduction and incidentally the application of turbine drives for cargo boats was further retarded by difficulties encountered in the years immediately following the war from the fracture of pinion teeth. Those who are familiar with the circumstances will remember that there was a kind of epidemic of tooth fractures lasting over a short period of time. Since such fractures occurred not after long years of service, but in nearly every case on the first voyage of the vessel, and since the difficulties disappeared on replacement, they were clearly not due to any inherent deficiency in the gearing. But as this experience occurred at the time that double reduction was first coming into use, a false impression was created as to the reliability of double reduction gearing. To prove, however, that there is nothing intrinsically amiss with double reduction gearing it is necessary only to refer to some of the numerous well known instances in which it has been successfully adopted.

The fact that in the experiments referred to above in the S. S. VESPASIAN mechanical gearing was first introduced and investigated particularly for cargo boat propulsion has been somewhat obscured by the rapid development which immediately took place in the use of gearing for other classes of marine propulsion.

The 1000 horsepower geared turbines of the VESPASIAN realized a reduction in steam consumption in comparison with the triple expansion engines which they replaced of about 15 per cent. In the S. S. CAIRNROSS, a vessel of 1600 shaft horsepower built for Cairns, Noble & Co., in 1912, with single reduction geared turbines, a similar improvement was obtained on the basis of a series of comparative trials with a sister ship having triple expansion engine, the S. S. CAIRNGOWAN. This experiment has already been mentioned above in connection with the relation between shaft horsepower and indicated horsepower.

### Low Upkeep Cost

The S. S. CAIRNROSS was used for coal transport during the war and was sunk by enemy action. She was replaced in 1920 by another ship of the same name of somewhat larger power, in which double reduction geared turbines were fitted, and a considerable further improvement obtained. With 200 degrees Fahr. of superheat the steam consumption (turbines only) was 9 pounds per shaft horsepower hour, equivalent to less than 8 pounds per indicated horsepower. Subsequently steamers for the same owners, also with double reduction turbines, have given similarly reduced consumptions.

As an example of low upkeep cost and of reliability it was stated by Mr. Waldie Cairns in 1928 that the total cost of renewals and overhauls after a period of 5½ years' running of a geared turbine ship under his control and working constantly under North Atlantic conditions was under £30. The main machinery in these vessels consisted of three turbines through which the steam expanded in series, an arrangement which has been widely adopted in marine work on the ground of lightness and efficiency, the high pressure part of the expansion range being carried out in a small high pressure turbine which could be made of high revolutions and small diameter with gain of efficiency and a more rigid construction. The high pressure and intermediate pressure turbines coupled tandem drove one primary gear and the low pressure turbine the other.

In other cases of 3-turbine designs the high pressure and intermediate pressure instead of being coupled tandem are coupled through separate pinions to the primary wheel on the corresponding side of the main gearing. In a three-turbine arrangement with single reduction, each turbine drives its own pinion so that the gearing consists of three pinions geared with one main wheel.

Before the introduction of mechanical gearing, the steam turbine was only able to enter the field of low speed propulsion of cargo vessels by being applied as an adjunct to the reciprocating engine in the form of an exhaust steam turbine, thus extending the range of expansion of the steam to a lower back pressure than was practicable with the reciprocating engine alone. Several notable vessels were so fitted. In the early proposals of this type the turbine drove its own propeller and there was still some considerable sacrifice of propeller efficiency. It was recognized that further improved performances would be obtained if the turbine propeller could be coupled to its turbine through some speed reduction device, and proposals on these lines were made by Sir Charles Parsons as early as 1906. In such a plant only one third of the total power would have to be transmitted through the gearing, and this was an attractive feature at a time when it had not yet been proved that it was quite practicable to transmit the whole of the power of the vessel through mechanical gearing between engine and propeller shaft.

Such installations can only be regarded now as temporary expedients. The low steam consumption rates just quoted for complete turbine installations will adequately explain why combined systems were not preserved with after mechanical gearing had been proved a successful means of coupling a high speed turbine to a low speed propeller.

Remarkable progress has been made during the last ten years in the economical operation of the propelling machinery of sea going vessels, resulting in considerable reductions in the fuel consumption bill. The introduction of the use of high pressure steam appears to have set this wave of economical progress in motion. But it has gathered up in its stride the results of intensive search for economies in all directions, some of them, it is true, of minor importance, but of considerable cumulative effect.

### Economical Auxiliary Machinery

It was the author's privilege to present a paper before this institute in 1926 on the subject of the contribution which economical auxiliary machinery could make towards the overall efficiency of a high pressure marine installatiton, in which paper were given estimates of overall fuel consumption which the author considered was attainable if due care were given to the various points affecting the efficiency of auxiliary machinery as well as to the efficiency of boilers and main turbines. This was at a time when the use of high pressure for the main turbines was just coming into prominence. The results predicted in that paper were in advance of anything previously obtained, but they have since been realized in practice, and in fact, in ships of somewhat larger power, have been substantially surpassed.

Three types of auxiliary drive were discussed, the well established system of separately driven steam auxiliaries with economical use of their exhaust steam, electrically driven auxiliaries with their current supplied either from turbo generators or from diesel engine generators, and

(*Continued on Page* 38)

# CANAL TOLLS,

## Based on a Single System of Measurement

BY COL. J. L. SCHLEY*

THE method of measuring merchant ships at the Panama canal and levying of tolls on them for passage through the waterway has been a matter of argument between the canal administration and organizations of American steamship owners for over 20 years, practically since the opening of the canal in 1914. The matter seems now about to reach a solution by compromise. Congressional action is necessary because the basis for the levying of tolls was fixed by an act of congress.

The canal administration has proposed repeatedly a revision of the law so as to base the tolls on tons of 100 cubic feet of all interior spaces usable for the carriage of cargo and passengers. The determination of such space is provided for by the Panama canal rules for the admeasurement of vessels. The present law, however, provides that the amount of tolls collectible shall be limited on the basis of the net tonnage as determined by the United States rules of measurement for the registry of vessels. The United States registry rules, like registry rules of practically all nations, allow considerable exemptions of usable space from inclusion in the net tonnage. The United States registry rules of measurement are made and interpreted by an official of the government who is not connected with the Panama canal.

*The author, Col. J. L. Schley, Corps of Engineers U. S. A., is Governor of the Panama Canal Zone.

The general result has been that the amount of tolls levied on vessels bears no exact relation to their useful capacity and has diminished as further usable spaces have been exempted from time to time by rulings of officials in charge of registry measurement. The Panama canal desires to change this method to the single basis of levy on net tonnage as determined by the canal rules, at rates to be fixed by the President within limits established by congress.

### Objections of Steamship Owners

Steamship owners have objected that the rates proposed in connection with the canal measurement would increase the charges on the majority of their vessels. This is something to which they are naturally opposed. The efforts at compromise involve possible modification of the Panama canal rules of measurement, primarily with respect to public spaces on passenger vessels, and the rate of tolls which the secretary of war will recommend to the President in case the levy is based solely on Panama canal measurement.

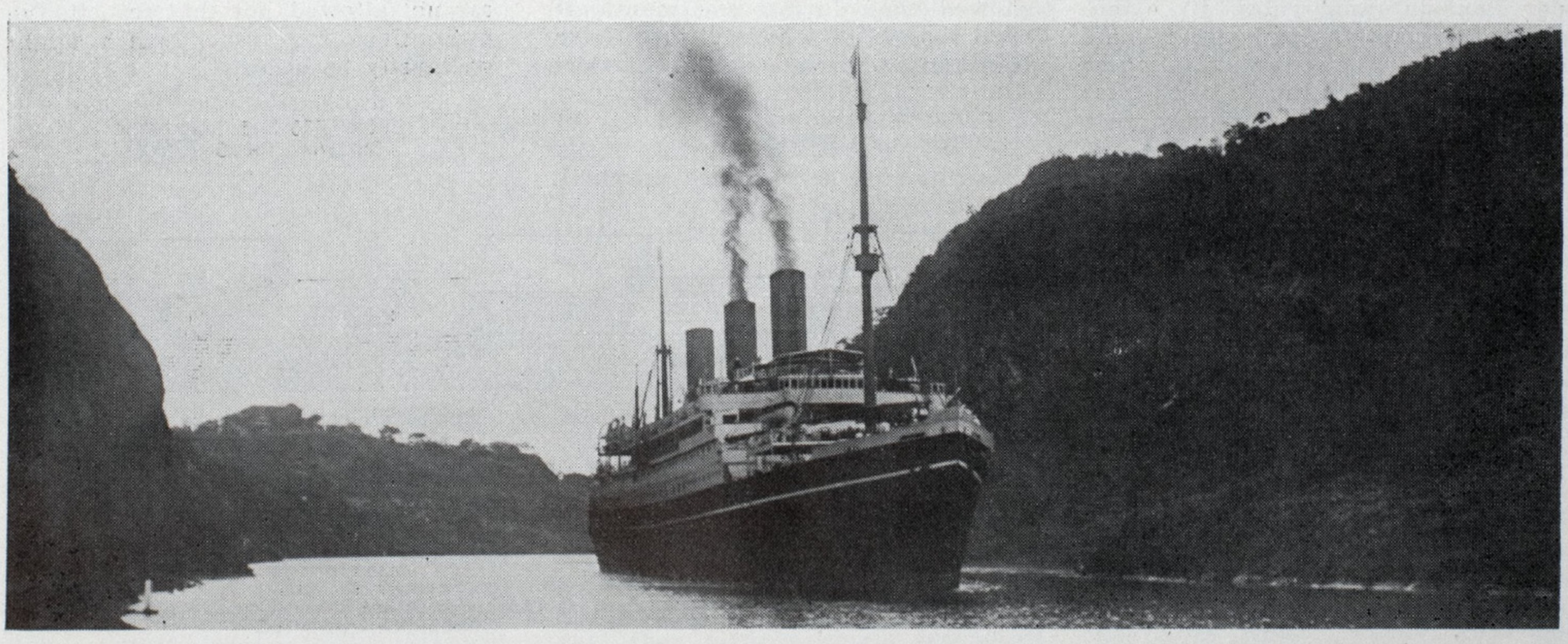
Gross tonnage includes, theoretically, all of the covered and closed-in spaces on the vessel but under the rules of measurement for registry exemptions are sometimes secured of spaces used for passenger cabins and even cargo. Net tonnage is that which remains after deducting from the gross tonnage crew spaces, spaces used for propelling power and bunkers, and other spaces used in the navigation of the vessel. It does not include certain spaces which may be exempted under the national rules of measurement, even though such spaces are actually used for passengers and cargo.

Because harbor dues of various sorts are often levied on net tonnage there is a tendency to diminish the net tonnage by more or less irregular technical methods, sanctioned by law. By such methods charges on the vessel may be diminished while her ability to use the space is not diminished. It is the extent and conditions of these exemptions or deductions which make all differences in the various national registry measurements of net tonnage and have been causing the trouble at the Panama canal with respect to the levying of tolls.

### Extent of Exemption

With traffic at the level of the past few years the exemptions of cargo carrying space in shelterdecks and superstructures amount to approximately 2,816,000 net tons per year. Of these, about 999,000 tons are on the United States vessels and approximately double the quantity, or about 1,826,000 tons, are on foreign vessels. United States vessels form over 45 per cent of the total transits but their exemptions are about 32 per cent of the total for these types of vessels.

United States vessels have predominated in the passenger trade through the canal and form by far the greater part of the traffic of pas-



*S. S. Empress of Australia, one of the World Cruise vessels, in Gaillard Cut, Panama Canal*

senger craft. Under a liberal interpretation of the term "cabin" and a change in the definition of the term "deck to the hull," exemption of large blocks of space used for the accommodation of passengers has been secured under the United States rules. This amounts to approximately 848,000 tons per year, of which 630,000 tons are on United States vessels and 218,000 tons of foreign ships.

The figures for the traffic in the fiscal year 1934 have just been computed and are indicated on the accompanying sketches Figs. 1, 2, 3 and 4 numbered 1 to 4, inclusive.

The history of exemption of useful space from inclusion within net tonnage under registry measurement makes it obvious that a form of net tonnage which embraces actual cargo and passenger space, as is the case with the Panama canal rules of measurement, will show materially greater tonnage than the registry tonnage. A comparison of the aggregate United States registry tonnage measurement of commercial vessels using the Panama canal during the entire year 1917 showed that the registry tonnage was 81.09 per cent of the net tonnage as determined under Panama canal rules. By extension of exemptions and adjustments of vessels to take advantage of them the tonnage under the United States rules has decreased relatively year by year. In the fiscal year 1934, the last for which we have complete figures, the aggregate United States equivalent net tonnage was 71.21 per cent of the aggregate Panama canal net tonnage. The drop from 81 to 71 per cent from the earlier year to the later indicates a large decrease in the relative measurement under the United States rules. It will continue to decrease. During the past year 38 vessels which were reconditioned in order to take advantage of technicalities in the rules secured a reduction in their net tonnage under United States rules from an aggregate of 215,241 tons to 163,507 tons, or 24.4 per cent.

This continued whittling down on the measurement of revenue earning spaces decreases unwarrantedly the amount of tolls which can be levied on the ships and it may also be inequitable as between vessels otherwise comparable, because certain features of construction which have no bearing otherwise on the capacity of the ship for handling cargo or passengers may make one eligible for reduced tolls while the tolls on the other are relatively higher.

Under the principle of lower charges on a vessel when it is not earning revenue, i. e., when it is without passengers or cargo, it was the intent of congress and the President that tolls should be lower on vessels in ballast than when laden. The President's proclamation set the relation at 40 per cent less. However, in the use of the dual measurement system it has been found that frequently the tonnage under the United States rules has been so greatly reduced that the tolls charges levied at the ballast rate, times the Panama canal net, are in excess of $1.25 times the United States net. The excess is not collectible. Such vessels then pay the same rate when in ballast as when laden. A check of traffic showed that during one month 40 such vessels, of which 2 were American and 38 foreign, paid tolls which were less than 72 cents per net ton, Canal measurement, and would therefore pay the same tolls whether laden or in ballast.

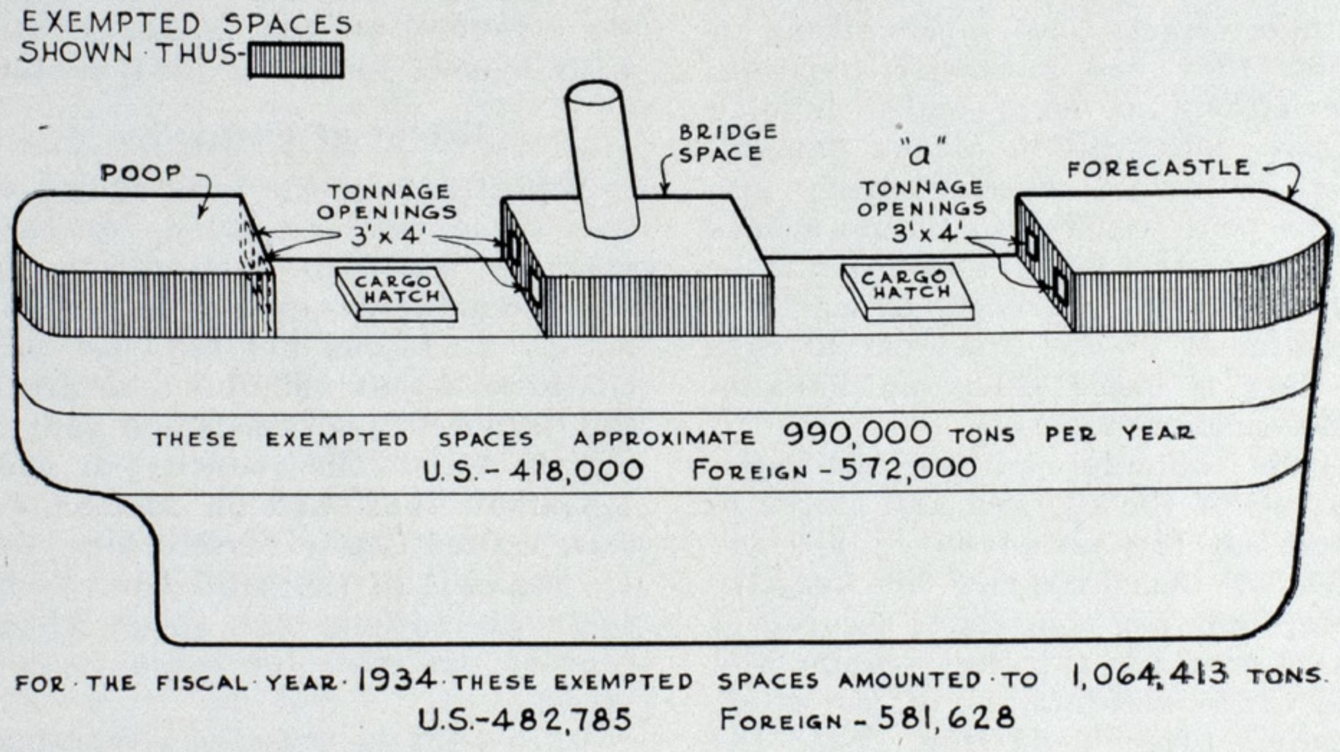



*Fig. 1—Cargo vessel with superstructure exempted*

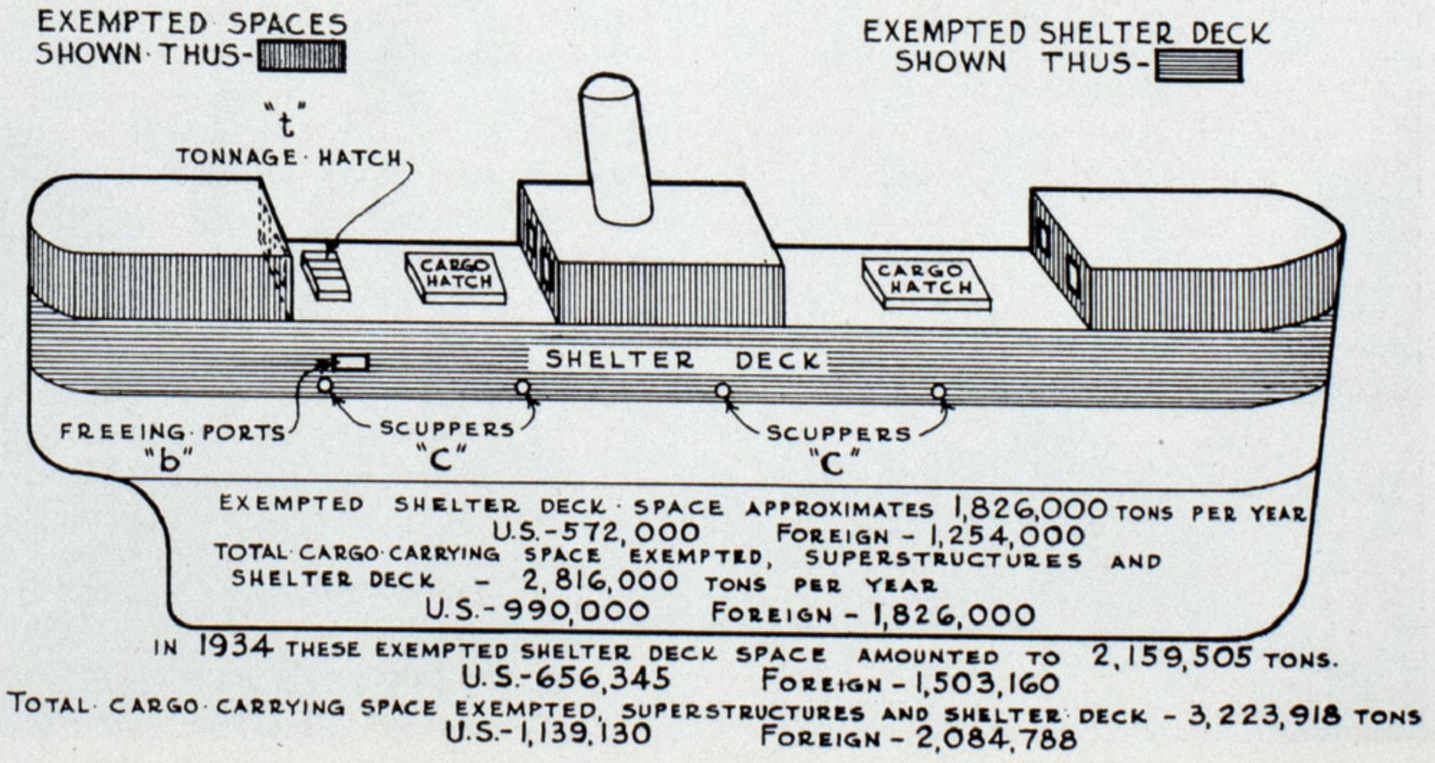
### Abnormal Variations; Owners' Resentments

In one instance where a passenger vessel was scheduled for transit through the canal the local agents, acting on orders from the home office, disembarked the passengers and their baggage at the port of arrival at the canal and shipped them across the Isthmus by rail in order that the vessel might transit without passengers or cargo and enjoy the ballast rate. When the tonnage of the vessel was checked by the admeasurers it was found that the tolls charges on this ship would have been the same if the vessel had transited with all passengers and baggage aboard as they were for transiting in ballast, and that therefore the trouble of moving the passengers overland was not offset by any saving but in fact incurred the additional cost of railway transportation.

Among the various instances of adjustment aboard vessels to take advantage of technicalities in the rules was that of a ship which converted a linen locker into a berth for a steward and thereby secured exemption of nearly 400 tons of space.

Another vessel, by installing a bed and temporary washstand in a cloak room, secured exemptions of passenger space totailing 3319 tons.

The regulations covering measurement of vessels under United States registry rules are promulgated in Washington, by the bureau of navigation, and interpreted by that office, whose decision is final. At the canal the net tonnage is derived under the regulations in force at the time and the conditions existing on board the vessel when it applies for transit. Frequently vessels arrive in conditions involving some infraction of the regulations with respect to method of closure, or for some other reason are not allowed, for that transit, the exemptions for spaces which might ordinarily be allowed.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CARGO HATCH
CARGO HATCH
EXEMPTED SHELTER DECK
SHOWN THUS-
SHELTER DECK
FREEING PORTS "b"
SCUPPERS "C"
SCUPPERS "C"
EXEMPTED SHELTER DECK SPACE APPROXIMATES 1,826,000 TONS PER YEAR
U.S.-572,000 FOREIGN - 1,254,000
TOTAL CARGO CARRYING SPACE EXEMPTED, SUPERSTRUCTURES AND SHELTER DECK - 2,816,000 TONS PER YEAR
U.S.-990,000 FOREIGN - 1,826,000
IN 1934 THESE EXEMPTED SHELTER DECK SPACE AMOUNTED TO 2,159,505 TONS.
U.S.-656,345 FOREIGN - 1,503,160
TOTAL CARGO CARRYING SPACE EXEMPTED, SUPERSTRUCTURES AND SHELTER DECK - 3,223,918 TONS
U.S.-1,139,130 FOREIGN - 2,084,788

*Fig. 2—Cargo vessel with superstructure and shelter deck exempted*

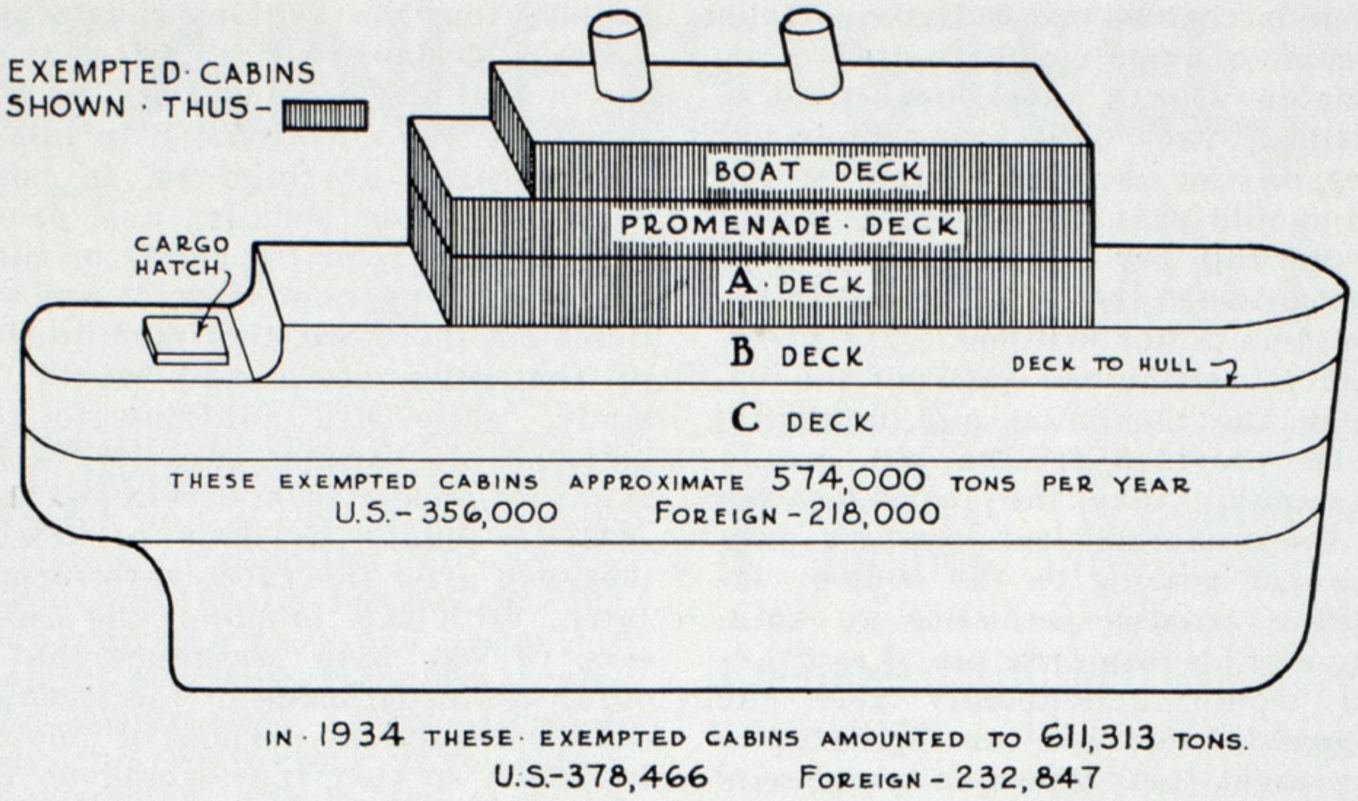


*Fig. 3—Passenger vessel, showing cabins exempted*

In such cases the tonnage is derived in accordance with the conditions found and is increased over that used on former transits. This is resented by the owners when brought to their attention and in many cases has resulted in discharge of the master or mate of the vessel or whoever is deemed responsible.

These variations in conditions may cause wide variations in the actual tolls charges on the same vessels for different trips. Whenever the tonnage is increased it is looked on as a penalty, which creates feelings of resentment because of action based on arbitrary rules. This causes useless friction among owners, agents, masters, and canal officials, which might well be avoided by the adoption of plain and dependable rules.

### With Relation to Safety

As happened in England under the "builders' old measurement rule," the safety of vessels has been affected by efforts to take advantage of provisions in the present registry measurement rules. Rear Admiral J. G. Tawresey, U. S. N., retired, who has represented the United States as delegate to the international conference on safety of life at sea, as well as to the international load line conference, has invited attention to potential dangers. Vessels built to use the Panama canal are constructed so as to secure the lowest tonnage possible under registry rules and minimize the tolls charges. Admiral Tawresey pointed out that the openings required in order to take advantage of shelterdeck exemption do not make the vessel safer but make her less safe.

Openings are cut in the deck and bulkheads and also freeing ports and scuppers are placed in the side walls of the vessel, which are not allowed to be permanently and efficiently closed but are permitted to be closed temporarily and inefficiently. These openings serve no purpose of safety or any other purpose than a technical compliance with the rules to secure exemption of space from measurement. The freeing ports and scuppers are a potential danger, for instead of caring for leakage they may admit water and be at least a potential cause for the loss of a vessel.

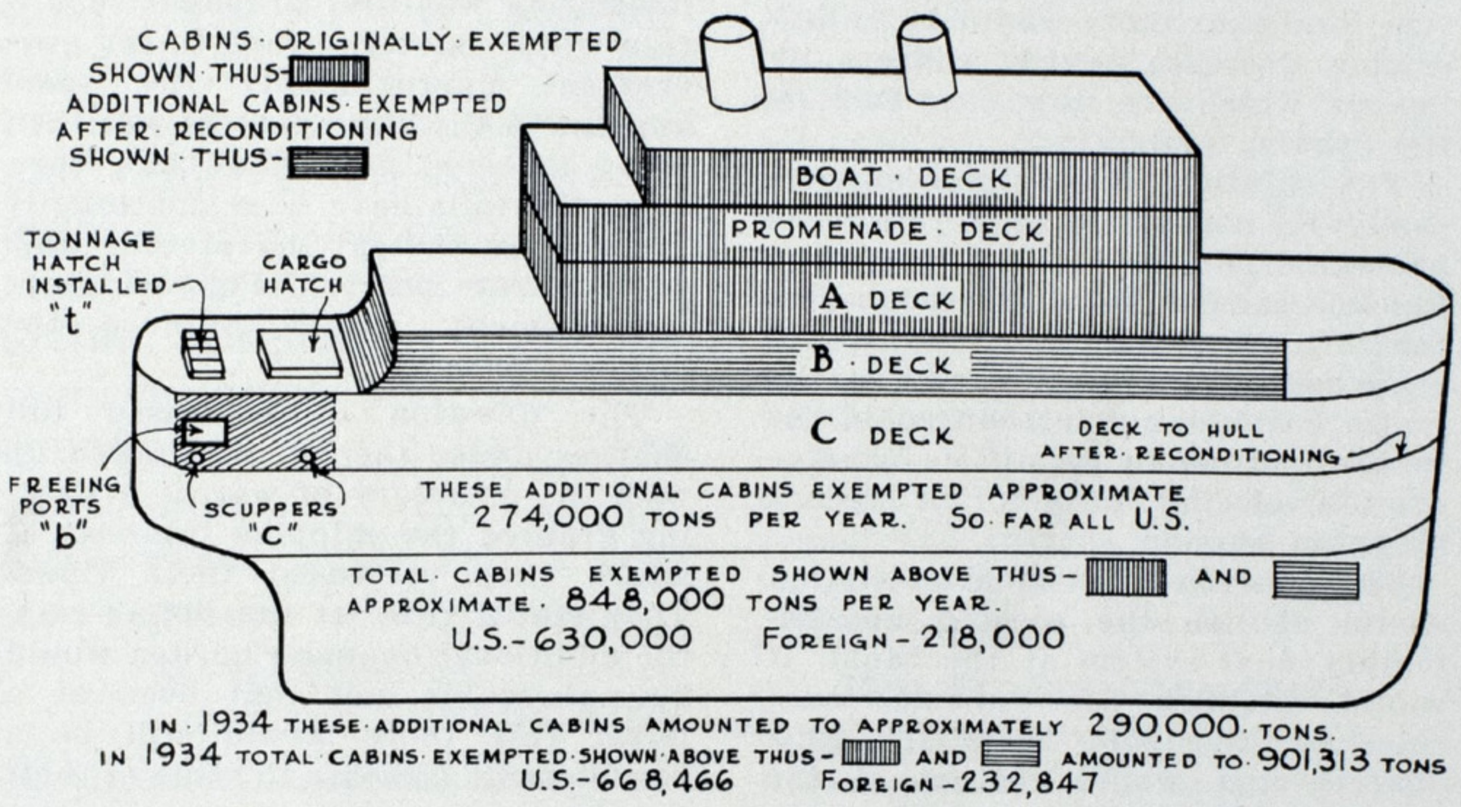
CABINS ORIGINALLY EXEMPTED SHOWN THUS –
ADDITIONAL CABINS EXEMPTED AFTER RECONDITIONING SHOWN THUS –
BOAT DECK
PROMENADE DECK
A DECK
B DECK
C DECK
TONNAGE HATCH INSTALLED "t"
CARGO HATCH
FREEING PORTS "b"
SCUPPERS "C"
DECK TO HULL AFTER RECONDITIONING
THESE ADDITIONAL CABINS EXEMPTED APPROXIMATE 274,000 TONS PER YEAR. SO FAR ALL U.S.
TOTAL CABINS EXEMPTED SHOWN ABOVE THUS – AND
APPROXIMATE 848,000 TONS PER YEAR.
U.S. – 630,000 FOREIGN – 218,000
IN 1934 THESE ADDITIONAL CABINS AMOUNTED TO APPROXIMATELY 290,000 TONS.
IN 1934 TOTAL CABINS EXEMPTED SHOWN ABOVE THUS – AND AMOUNTED TO 901,313 TONS
U.S. – 668,466 FOREIGN – 232,847

*Fig. 4—Passenger vessel, showing cabins exempted after reconditioning*

There is general agreement that except for the virtue of allowing lower tolls charges to those ships which can secure exemption of space the present dual system is unsatisfactory. The canal administration has consistently recommended congressional action making possible the adoption of a better method and a former head of the bureau of navigation has on several occasions recommended such action in his reports to the secretary of commerce.

David Arnott, chief surveyor of the American Bureau of Shipping, has pointed out that the present situation can not be considered satisfactory either to canal authorities or to shipowners, as a dual system of measurement is frankly a nuisance as well as being unsound in principle. Representatives of the steamship interests recognize that the dual system is unsatisfactory and have stated that they favor a single system of measurement but they object to any measurement system that would result in increased charges to any of their members.

This attitude on the part of the vessel operators would seem logical from their point of view. On the other hand the present system produces such wide variations in the collections per ton of actual earning capacity, as measured under Panama canal rules, which are admittedly just, that the present charges can not be accepted as equitable.

During the fiscal year 1934 the average of tolls collected on laden French vessels was 79.7 cents per Panama canal net ton. On the Norwegian vessels in the same year the tolls averaged 80 cents per ton; on the German, 82.8 cents; Dutch, 83.3 cents; United States, 87 cents; British, 87.6 cents; and on Japanese, 99.7 cents. On all laden ships taken together the average was 86.9 cents. It is seen that the French vessels averaged 20 cents less per ton than the Japanese and 7.3 cents less than the United States.

The very extent of the variations under the present inaccurate dual measurement system make it impractical to accept the rate of tolls collection under this system as a fair limit in establishing the rate to be charged if a single basis of Panama canal measurement is adopted. The vessels, both United States and foreign, which are profiting by the present rules do so at the expense of other vessels which are paying a higher rate per ton than they would pay if the uniform basis of equitable tonnage measurement were adopted.

In the fiscal year 1934 the charges on British vessels were slightly higher on the average than on American ships but with that exception the United States vessels have paid higher for the past five years than vessels of any other nation but the Japanese. The charges on the Japanese ships are relatively high because they include no large passenger ships using the canal and their cargo carriers have not heretofore

taken advantage of the rules to reduce tonnage by exemption of the shelterdeck. They are now beginning to do so, however, and will soon show a substantial reduction.

**Method Fairer to All**

The proposed remedial legislation would base charges on the net ton as determined under the Panama canal measurement rules. The figures quoted above are with respect to the same Panama canal net tonnage. It will be seen that if the rate per ton established for application on the canal net tonnage should result in increased charges on vessels it would result in greater increases on vessels of all foreign countries, except Japan, than on vessels of the United States.

It must be recognized that the change from the system which is obviously unfair as between nations and as between vessels of those nations, to one which is fair and equitable for all must result in some increase to individual ships which are now benefited unduly by the existing system; and that there would be an offsetting decrease in the charges on vessels which are now penalized by the existing system.

The solution of this problem lies solely in congressional action. The passage of H. R. 7667, known as the Panama canal tolls bill, introduced in the last session of congress, would have solved it. This bill passed the house but was not introduced in the senate in time to permit its passage in the closing days of a record breaking session.

The enactment of such legislation would abolish the present unsatisfactory dual system at the canal. It would establish the Panama canal rules as the sole basis for tolls charges and would restore to the President the right to set the rate per ton between the limits provided in the bill. It would definitely eliminate charges on deck loads. By postponing the effective date for a year or more from date of passage, as proposed, it would allow ample time for steamship interests to adjust themselves to the new system, and by that time the cost of any reconditioning already made to reduce tolls charges would have been covered by the reductions secured.

The bill is not designed to increase the present revenue at the Panama canal but to prevent further and unjustified continuing decreases in revenue. It would provide a method of measurement free from administrative difficulties and not subject to manipulation but which would produce a measure of tonnage that will truly represent the earning capacity of the vessel. It will then be just and fair to the United States government and the shipping interests, not only of the United States but of the world at large.

The American Steamship Owners association vigorously opposed the enactment of such legislation on the grounds that it would increase tolls to some of their members. It is questionable whether such opposition is justified. They have based their figures on the assumption that if the bill should pass, the President would set the rate per ton at the maximum rate provided in the bill. Such an assumption is not justified. The President, in setting the rate per ton between the maximum and minimum limits provided in the bill, would presumably take into consideration all the numerous factors which have a proper bearing on the subject, including possible injustice to shipping and his own program of recovery and would undoubtedly give the steamship interests an opportunity to present their views as to the rate that should be established.

**Rates for Canal Measurement**

It is true that the canal authorities have advocated a $1.00 rate for laden vessels. This, however, was based on the fact that when the remedial legislation was first proposed such a rate would have returned to the government approximately the same amount in the aggregate as was then being collected. Since that time, however, the tolls have been continually lowered, so that at the present time a lesser rate per ton, Panama canal measurement, would produce the present revenue.

The question of increased toll charges under the bill was taken up with the secretary of war at a hearing granted the shipping interests at which they presented their views. They stated that, at the dollar rate, the additional financial burden would be unbearable and that even at a lesser rate there would still be a considerable increase to some of their members.

The result of that hearing was an assurance from the secretary of war that he would recommend to the President in fixing the tolls rate under the law, in the event the bill should pass, the adoption of a rate on laden vessels of not more than 90 cents.

Under the figures for the fiscal year 1933 the tolls collected at this rate would have amounted to $318,204.43 less than were actually collected under the dual system. United States vessels would have paid $230,187.31 less than they actually did pay, and foreign vessels $88,017.12 less. Norwegian vessels would have paid $33,500 more; French $41,190 more; German $62,350 more; Dutch $15,140 more; British $150,435 less; and Japanese $113,517 less. Thus it will be seen that in the year the United States vessels would have benefited more in the aggregate, than those of any other nation.

With reference to the claim that there would result an excessive increase to certain types of vessels placed in service since the Panama canal rules were formulated, it may be said that the Panama canal rules were so designed as to reflect truly the actual earning capacity of the vessel. It was not intended to retard the natural development in ship construction or penalize any provisions designed for the safety or comfort of passengers or crew. It was anticipated, therefore, that modification of the rules could and would be made, while still adhering to the principle of earning capacity, when it should appear from experience that injustice might be done to vessels designed after the rules were formulated. With this in mind, the secretary of war gave assurance that a study would be made of the Panama canal rules for the purpose of modifying them so that they would be applied with equity to all types of vessels transiting the canal.

Especially does this apply to the large passenger vessels now using the Panama canal. A preliminary study of this type of vessel indicates that there are certain spaces, such as public rooms, lobbies, music rooms, etc., that could, while still adhering to the principle that the basis of tolls should be on actual earning capacity, be eliminated from the tonnage on the grounds that they are non-revenue producing, as compared with staterooms, etc., which produce revenue. On lines regularly using the canal such spaces amount to approximately 300,000 tons per year.

**Approach to Agreement**

It would appear, then, that the rates would in effect be much lower to all vessels except those few, which, by reason of technicalities in the rules, have been able to reduce their tolls charges far beyond the point of fairness.

It is difficult to understand why a few who are now unduly benefiting by an unfair system should be allowed to block legislation that will lighten the tolls burden to the whole industry at a time when by their testimony they are sorely in need of such relief. The amounts by which the tolls of these few would be increased, when the tolls on others and the aggregate traffic would be reduced, are an indicattion of the extent to which they are now benefiting unduly at the expense of fellow members. It would appear then that the Steamship Owners association should lend its offices to assist in the enactment of this legislation for the good of the industry, rather than object to it because a favored few would no longer enjoy special benefits at the expense of the remainder of the traffic. Adjustment of the situation is not only plainly warranted but highly desirable. It has been too long deferred, and it is the hope of the canal administration that agreement for removing this ancient source of trouble can be reached and the legislation passed in the present session of congress.

# STAINLESS STEEL,

## Experience in Two Naval Applications

RUMORS of serious failures of corrosion resisting steel in warships of the United States navy have been circulating for several months, and finally reached publication saying the navy had decided to eliminate such steel from vessels now under construction. This bad news (quite inaccurate) has traveled fast, and, although quickly denied by responsible naval officers, has disturbed many consumers of the corrosion resisting steels, and raised some doubts as to the utility of these alloys for severe service. The facts are worthy of record:

The bureau of construction and repair, United States navy, has been interested in corrosion resisting steels ever since their commercial production. They offered opportunities for weight saving and permanence when replacing galvanized steel or wrought iron; the latter either had to be used in extra heavy section to provide for corrosion losses or replaced before the ship became obsolete.

### Weight Saving Important

Weight saved on the top sides increases the stability of the ship and permits an equal increase in power plant or armament. Consequently the navy has put an important tonnage of strip and sheet analyzing 18 per cent chromium, 8 per cent nickel (the so-called 18-8) into deck houses, floors, hatch covers, and a variety of other structures exposed to atmospheric corrosion in port and to dashing spray or water in a seaway. In these places the metal has served excellently, and the navy has no intention of avoiding such uses in the future. The same may also be said of some other applications of corrosion resistant steel where the metal is attached to the hull so it is submerged almost continuously, such as rods and arms for operating diving fins on submarines, and stranded wire cables for mooring.

These satisfactory results encouraged the naval constructors to put corrosion resisting steel into two applications in which unfortunately it did not stand up—namely, gasoline stowage tanks and fire lines. Let us examine the circumstances surrounding such failures.

Salt water is pumped into the bottom of the tanks so the gasoline can be drawn off under hydraulic pressure at all times; consequently the stowage tanks contain variable quantities of gasoline, doped with tetraethyl lead and ethylene dibromide, and sea water more or less fouled with marine organisms or diluted sewage. Tanks on the first aircraft carriers had been made of galvanized steel plate, welded, with welds tinned —a reasonably satisfactory construction. On the newer ships the tanks were to be built into the hull in quite inaccessible locations, and the use of 18-8 promised absolute immunity from leakage (most dangerous in confined spaces aboard ship!) for the entire life of the hull.

### Experience With Fire Lines

The second unsatisfactory experience was with fire lines of thin-walled seamless tubing, installed on the latest 10,000-ton cruisers. In older ships galvanized steel or iron pipe has been used, much heavier in wall thickness and of less life than the hull. It was anticipated that the 18-8 would resist sea water perfectly, and not only save considerable weight, but also the cost of expensive replacements.

In both situations the stainless steel failed by pitting in as short a time as six months! These two are the applications which have given all the trouble, which are being removed from existing ships, and which will not be resumed until the cause is definitely known and cured. It would be a dis-service to corrosion resisting steel to gloss over the facts, and allow other users to stumble into similar troubles.

A multiude of laboratory salt spray tests and extensive naval experience prove that commercial 18-8 totally resistant to common salt (sodium chloride), sea salt and sea water when moving vigorously and aerated, or to seashore and marine atmospheres. Trouble by pitting apparently exists only in stagnant sea or harbor water, and there is not the least cause for worry about a multitude of applications in dozens of industries where chloride ions, stagnant solutions, and foul deposits are not encountered or not permitted.

Very serious study has been given to these failures, both by naval personnel and various metallurgists. It would be well to list some of the findings to date.

### Heat Treatment Questioned

The first gasoline tanks were of welded plate, and the heat treatment subsequent to fabrication was improperly done. Damaging pits occurred in locations where the metal had not been quenched rapidly enough in final heat treatment, a condition which makes 18-8 susceptible to intergranular corrosion, as is well known. To avoid this condition on later tanks they were made of metal higher in alloying elements (approaching 19 per cent chromium, 9 per cent nickel), lower in carbon (below 0.06 per cent), and unusually clear of solid nonmetallic inclusions —all matters which are believed to increase the stability of the alloy—yet serious pitting occurred in a few months! Location of these pits could not be correlated with welds, bends, or position of plate. Large areas were unaffected. Some pits were so small or tightly closed as to elude careful inspection and were located only by "weeping" of gasoline outside. The under-surface cavities, when cut into, are of various shapes, and contain entrapped moisture so tenaciously that bubbles of corrosion products are exuded even after months in dry. warm storage. Others are open at

(*Continued on Page* 36)

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THE navy is continuing without interruption a very large use of stainless steel sheet and plate in floors, partitions, deck houses, hatches, and numberless other places where the metal is exposed only intermittently to sea water. Abundant experience proves its remarkable resistance to such conditions. The navy is abandoning a much more limited use of stainless steel in pipe lines and tanks where sea water, more or less stagnant, is constantly in contact with the metal. Under these circumstances deep pits are corroded into the metal. The cause and cure are not yet discovered, although intensive research is under way.

**W. H. Eisenman,** Secretary,
*American Society for Metals*

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Reprinted in part from an editorial published in the February issue of *Metal Progress,* the monthly magazine of the American Society for Metals.

# USWORTH RESCUE,

## Weather Conditions Unusually Severe

BY CAPT. J. G. BISSET

THE USWORTH had been in trouble with her steering gear for over three days in very bad weather. During that time the Belgian steamer JEAN JADOT had been standing by and once managed to get her in tow for about three hours, intending to make for Fayal (Azores) about 600 miles distant. On the night of Dec. 13, 1934, the USWORTH was struck by an abnormally high sea which shifted her grain cargo giving her a 25 degree list, also sweeping away boats, ladders, derricks and other deck fittings and buckling the hatch coamings. Her wireless aerial having blown down they rigged a temporary one and sent out the S.O.S. which was repeated on full strength by the JEAN JADOT.

This was picked up by the ASCANIA at midnight and comparisons of the two positions which were very approximate after continuous bad weather, indicated that the USWORTH was 75 miles away on a 130 course.

The weather at the time was strong northwest gale, high sea and the barometer had just started to rise.

ASCANIA was turned to 130 which was later corrected to 128 after several good direction finder bearings of JEAN JADOT.

### Receives First Direct Message

About 3 a.m. the first direct message came through from the USWORTH, stating that her position was extremely precarious and asking that every effort be made to take off her crew of 26 men.

At 4:30 a.m. the visibility being perfect and no sign of either vessel, I asked for rockets to be fired as a check on the direction finder bearings. USWORTH'S rockets were wet, but JEAN JADOT replied that he would fire three at a certain time. These showed up distinctly right ahead, very low on the horizon, and proved to be 30 miles away, indicating considerable discrepancy in our given positions, and illustrating the marvelous benefits of direction finder bearings. At 7 a.m. the ASCANIA arrived on the scene and after an exchange of signals with the JEAN JADOT we were agreed that the sea was too high and dangerous to send away a manned boat, but that it might be possible to fire a line over the USWORTH by which he could pull over an empty boat.

I had made all preparations for this by having 5000 feet of 3½-inch manila boat falls coiled on deck and a boat heavily protected by mattresses lashed round the gunwales and all the gear secured to the thwarts.

At the request of the JEAN JADOT, I spread a large "slick" of oil fuel for about two miles to leeward of the USWORTH while he made the first attempt from the only possible position, that is, on her weather quarter. Both his rockets missed and in a few minutes, being very light ship, he had drifted out of position. Shortly afterwards I tried with the ASCANIA and had no better luck.

It was estimated that the USWORTH was drifting at about 2 knots and the ASCANIA at 4 knots and both ships were forging ahead owing to wind pressure on the sides, at about the same rates. This fact, coupled with the violent motion of the vessels and the difficulty of manoeuvering in the high wind and sea, made it extremely hazardous to approach too near the USWORTH, especially to windward. We each made another attempt with the rockets, but it was realized that had we succeeded in connecting, the ships would have drifted too far apart before anything useful could be done.

Capt. J. G. Bisset

*On the bridge of the R. M. S. Ascania*

There was nothing for it but to wait for the weather to moderate, but now, despite the rapidly rising glass, heavy squalls of hail and sleet were sweeping over and keeping the sea heaped up. About noon the JEAN JADOT decided to send a boat. Getting into a good position, she lowered an empty boat and the crew of nine had extreme difficulty in getting into her downside ladders.

Eventually, they got away and after a tremendous struggle got under the lee of the USWORTH and took off 14 men, but having pulled clear of the USWORTH and while waiting to be picked up, the boat capsized on top of a tremendous sea, losing 12 of the USWORTH'S and 2 of her own gallant crew. This left 12 men still on the USWORTH, and she appeared to be getting lower in the water and wallowing dangerously. The sea had not moderated and it would be dark at 4 p.m. Having spread a good oil slick to leeward, I steamed round to the weather quarter at 1:30 p.m. and swung out and manned the port sea boat with an officer and ten able seamen. This was a 30-foot, clincher built lifeboat, capable of carrying 62 persons, and well protected by mattresses on its starboard side. She carried two sets of oars, two sea anchors, several tins of oil and red lights and a coil of 2½-inch manila.

### Brings Ascania into Position

With an officer in the bows, keeping me informed by telephone, I angled the ASCANIA into position slightly on the USWORTH'S weather quarter, with our stem about 100 feet from her stern, and lowered the boat. She was pulled forward by a line from the forecastle head, which was passed aft in the boat in an endeavor to spring her off. Owing to her great drift this was only partly successful and as the boat slithered forward under the bows she was in imminent danger of being crushed by the ship's forefoot which was rising clear out of the water. Once clear of the stem, pulling was no easy matter, and as the weather oars missed stroke the wind blew across the boat. In the circumstances it seemed a miracle that the crew were able to propel her across that wild, intervening space and under the lee of the USWORTH. The officer used the rudder and reported that owing to the

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The author, Capt. J. G. Bisset, is master of the Cunard White Star liner, ASCANIA, and participated in the rescue.

violent motion of the boat, it would have been well nigh impossible to use a steering oar.

Once under the USWORTH'S lee there was great danger in getting alongside as her forward derricks were laying across the bulwarks and sawing back and forth, and her davits, about 100 feet further aft, were bent double and dipping in the sea as she lurched. Heavy seas were breaking over her frequently, and on the low side the sea was surging inboard up to the hatch coamings and burying her to the level of the bridge deck.

At first the officer held the boat off by keeping her stern on and using the oars, and shouted to the men to jump. Three of them, the cook, steward and cabin boy, did so, but falling far short, they were swept aft by a sea and drowned despite strenuous efforts to reach them.

After this, the officer, despite the great risk, put the boat alongside the USWORTH and the remaining nine men jumped into her. One of them, an Afghan fireman, weighing eighteen stone, fell on top of one of the ASCANIA'S seamen, breaking his thigh. During this period 8 out of 14 oars were broken fending the boat off to prevent her surging on to the USWORTH'S deck as she buried her lee rail under water.

Getting away from the USWORTH'S side was a problem which was solved by a heavy sea breaking over her, half filling the boat and throwing her sufficiently clear for them to get the remaining oars out and pull away. Once clear they lay to a sea anchor while I brought the ASCANIA round in a wide circle and picked her up, not however, without much difficulty and danger as she was rising and falling 20 feet or more alongside. Eventually they were all out, most of them being hauled up in bowlines, and the damaged boat was cast adrift.

One hundred and twenty tons of oil fuel was distributed by the ASCANIA during six hours near the wreck. It is not entirely satisfactory as it lies around in patches and does not spread well. Nevertheless, it was extremely useful, although the JEAN JADOT reports that he would have saved more men from his capsized boat if they had not been smothered by oil fuel.

Lloyds is presenting the boat officer with a silver medal and the men with bronze medals. The Cunard White Star line granted each man one month's wages in reward for their heroic services.

# Shipbuilding Costs Should be Equalized

RETURNING to the West coast from extended hearings at Washington, on the matter of mail subsidies to American ship operators, R. Stanley Dollar, president, and A. F. Haines, vice president and general manager of the American Mail line, expressed the conviction that American shipyards are in greater need of governmental aid than shipowners.

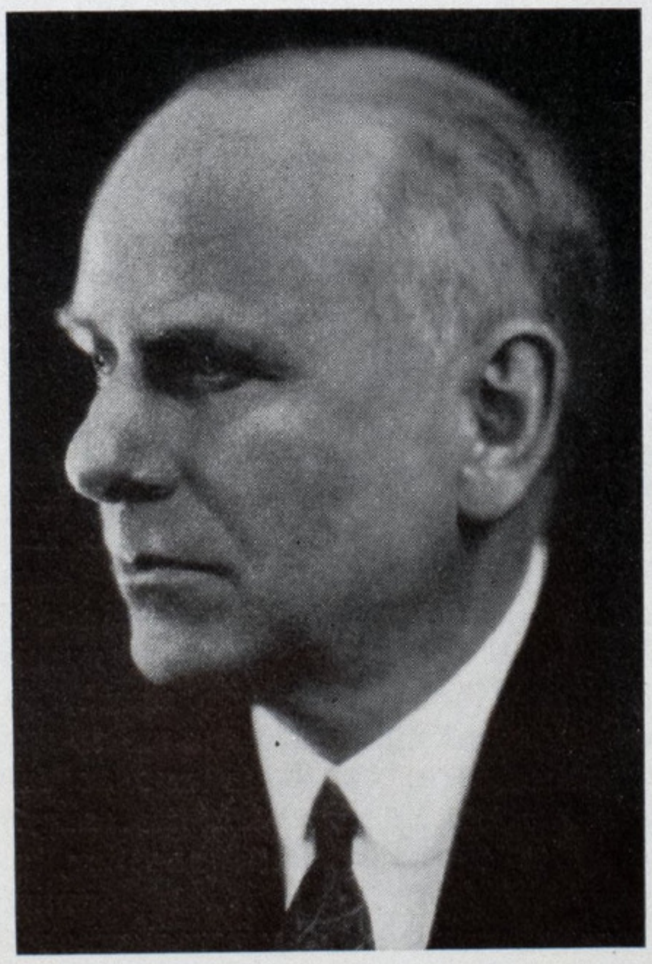
Briefly, if the government will subsidize American shipyards so that they can furnish tonnage to American owners on a parity with foreign builders, American lines will be able to survive foreign competition. American operators would like the government also to equalize operating expenses but this perhaps could be accomplished by government mail contracts to American ships on a poundage basis.

They advocate a definite government shipping policy over a 15-year period at least so that American owners can plan for the future. They state that the administration is friendly to shipping and wants to assist the merchant marine but the question is how best to accomplish this result.

"Unless the government aids the merchant marine very promptly," said Mr. Haines to a representative of MARINE REVIEW," it will not be long before there are no American flag ships in foreign trade. We cannot survive under present conditions. Our off shore fleet is fast becoming obsolete and must be replaced. We are unable to get new tonnage on a cost basis that will enable us to meet foreign competition. We want the government to help us obtain new, modern and fast ships on a cost basis equal to that of foreign countries. Of course even then we still have the handicap of higher operating expenses under the American flag but the greatest drawback is the heavy initial investment.

"If our American fleets are given a chance to start at scratch with our foreign competitors for foreign trade, our people will do their share and you will see American ships handling 50 per cent of the foreign trade of the United States. Our merchant marine today is obsolete with the exception of the few new vessels constructed under the terms of the Jones-White act. Most of our ships were built nearly 20 years ago and we are losing out to foreign fleets, fast and economically operated. The same may be said of the intercoastal fleets except that they are in a protected trade.

"American yards today are building only 1½ per cent of the world's new tonnage because we have no program for our merchant marine. With a definite policy that would insure the future of our flag in foreign trade, I venture to state there is ample capital available in this country to finance a vast reconstruction program and a great extension of our foreign trade.



A. F. Haines

*Vice President, American Mail Line*

"The steamers PRESIDENT COOLIDGE and PRESIDENT HOOVER cost $8,000,000 apiece. They could probably have been built in foreign yards for $4,000,000 each. This difference in investment is a terrific handicap. In other words, each of these vessels must earn $600,000 a year before they are on an investment parity with foreign ships. This is based on a 5 per cent annual rate for interest, insurance and depreciation of 15 per cent on investment. In the case of these two vessels it amounts to a handicap of nearly $2000 a day.

"If the government would rehabilitate the American shipyards by absorbing some of the extra costs of constructing a merchant marine, it would give new life to all industry throughout the country and establish a system of shipbuilding plants that would be a tower of strength in times of national emergency. I know of no better method of overcoming the depression for such a program would absorb a large number of the unemployed, assure us new merchant ships that, fully occupied, would spend great sums for operating expenses and labor. And the American people would have their own tonnage in which to ship their goods.

"In addition, the government should aid the operator in foreign trades to equalize operating expenses. This, however, is a detail that could be easily worked out. Aid the shipyards and that will put the merchant marine on its feet."

# Late Decisions in Maritime Law

## Legal Tips for Shipowners and Officers

Specially Compiled for Marine Review
By Harry Bowne Skillman
*Attorney at Law*

THE rule is well established that the innocence of the owner is not a defense to forfeiture in rem incurred under the customs and navigation laws. It may be noted, however, that an innocent owner is not deprived of relief. He may petition the secretary of the treasury or the secretary of commerce for the remission or mitigation of forfeiture in accordance with the procedure outlined in section 618 of the tariff act of 1930. A vessel licensed for fishing only and seized with a cargo of foreign liquor was subject to the statute directing forfeiture of a vessel employed in trade other than that for which she is licensed, notwithstanding the fact that the vessel had been stolen and used without the owner's knowledge or consent.—Julia Davis, 72 F. (2d) 370.

* * *

THE duty of shipowners to their seamen to see that their ship is seaworthy and her equipment in safe condition for use when she starts on a voyage is a personal one, responsibility for which they cannot escape by delegating its performance to another, it was affirmed in the case of Sabine Towing Co. v. Brennan, 72 F. (2d) 490. In this case, the court held that when one buys an old tug, licensed coastwise, and equips it for ocean going, it is negligence to send it out without knowing something of her stability, and especially to send it out without tests of its stability, when its history and performance in regard to crankiness and tenderness is a matter of official record. It was also held that, generally, a storm relied upon to explain loss of a boat in rebuttal of a claim of unseaworthiness must be shown to have been of extraordinary intensity.

* * *

VESSELS have the paramount right to use navigable waters free from obstructions, it was declared in the case of United States V. Henry Steers, Inc., 8 Fed. Supp. 363, wherein it was decided that where a tug had no notice that a submarine electric cable lying upon the bottom of a navigable channel was not intrenched, and was warned only against anchoring, was not liable for breaking of a cable while navigating the channel at low tide. "Decisions involving damage to cables and pipe lines," said the court, "make a distinction between those imbedded in a trench in the bottom or located so as to be clear of ordinary navigation and are dug up by an anchor which had been dropped in their vicinity in spite of notice of the danger to a buried cable or pipe line, and those laid on the bottom and which may be an obstruction to navigation."

* * *

IN THE case of Elliott v. Lombard, 72 F. (2d) 543, which involved liability for collision, it appeared that neither of the vessels, though seeing each other's lights when a mile apart, blew any signals at any time and each boat kept her course and speed in the Panama canal until they had approached to within 50 to 75 feet of each other, when the engines of both were put full speed astern, in an effort to check headway, but too late to avoid collision. The court, after citing rules and regulations governing navigation in the Canal, declared that had passing signals been given and understood when the vessels first sighted each other, "it is reasonably certain the collision would have been averted. When signals were not given it was the duty of each vessel to immediately stop and back her engines. The conclusion we reach is that the vessels were equally at fault. The proximate cause of the collision was the negligence of their operators in failing to observe the rules and in failing to use good judgment and seamanship." Damages were divided.

* * *

IN A suit by cargo for collision damages, no distinction purely as an element of damages is to be made broadly between physical cargo damage and damages sustained by cargo by reason of general average contributions. The two stand, generally speaking, on the same footing. Furthermore, cargo is not at fault for a collision in which the carrying ship is involved with another, and may recover its provable damages from the noncarrying vessel when the fault of that ship is a contributing cause. When both ships in collision are at fault and cargo is recovered from the noncarrying vessel, the owners of that ship may recover from the carrying vessel one-half of the cargo damages on a division of the total damage for the purpose of determining ultimate recovery as between the two ships. And when the balance between the ships has been struck, there is a single recovery from the other ship by the ship which has proved the greater loss. TOLUMA, 72 F. (2d) 690.

* * *

WHERE a club insurance policy indemnified assured for loss or damage arising from collision with another ship to the extent that such liability was not covered by hull insurance containing a clause for settlement of claims thereunder on principle of cross-liabilities and exempting the hull underwriters from liability for any sum which assured should pay in respect of the insured ship's cargo, the principle of cross-liabilities did not apply to the settlement of collision loss or damage not covered by hull insurance, and the club insurer was liable, on the basis of single liability, for any collision loss or damage imposed by law on assured and not covered by hull insurance; modification of the hull insurance by substituting four-fourths for three-fourths as proportion to be paid by the hull underwriters in the event of liability did not eliminate liability under the club insurance policy.—New York & Cuba Mail Steamship Co. v. American Steamship Owners' Mutual Protection & Indemnity Ass'n., 72 F. (2d) 694.

* * *

DELIVERY on the wharf in the case of goods transported by ships is sufficient, if due notice be given to the consignees and the consignments be properly separated, so as to be open to inspection and conveniently accessible to their respective owners. Notice and accessibility were held inferable in the case of Southern Pacific Co. v. Van Hoosear, 72 F. (2d) 903, inasmuch as the consignee both sorted and sold goods at the wharf; and there was actual delivery when the freight handlers, acting for the consignee, presented the delivery orders and received and moved the goods.

# Marine Business Statistics Condensed

## Record of Traffic at Principal American Ports for Past Year

### New York

(Exclusive of Domestic)

| Month | —Entrances— No. ships | Net tonnage | —Clearances— No. ships | Net tonnage |
|---|---|---|---|---|
| January, 1935 | 277 | 1,602,975 | 300 | 1,649,284 |
| December, 1934 | 282 | 1,429,129 | 267 | 1,409,462 |
| November | 280 | 1,356,331 | 306 | 1,475,818 |
| October | 290 | 1,555,651 | 284 | 1,539,537 |
| September | 271 | 1,645,919 | 284 | 1,624,272 |
| August | 296 | 1,815,221 | 332 | 1,859,966 |
| July | 313 | 1,686,825 | 295 | 1,574,395 |
| June | 239 | 1,696,804 | 324 | 1,785,815 |
| May | 291 | 1,597,233 | 316 | 1,662,711 |
| April | 288 | 1,599,185 | 274 | 1,477,492 |

### Philadelphia

(Including Chester, Wilmington and the whole Philadelphia port district)
(Exclusive of Domestic)

| Month | —Entrances— No. ships | Net tonnage | —Clearances— No. ships | Net tonnage |
|---|---|---|---|---|
| January, 1935 | 43 | 131,730 | 41 | 122,204 |
| December, 1934 | 62 | 184,844 | 47 | 136,559 |
| November | 58 | 156,483 | 56 | 130,800 |
| October | 55 | 143,330 | 56 | 146,265 |
| September | 52 | 143,092 | 44 | 115,845 |
| August | 56 | 151,501 | 41 | 120,875 |
| July | 48 | 125,616 | 35 | 89,902 |
| June | 61 | 191,042 | 53 | 155,308 |
| May | 58 | 169,719 | 50 | 143,652 |
| April | 67 | 199,032 | 48 | 147,083 |

### Boston

(Exclusive of Domestic)

| Month | —Entrances— No. ships | Net tonnage | —Clearances— No. ships | Net tonnage |
|---|---|---|---|---|
| January, 1935 | 88 | 308,292 | 51 | 191,279 |
| December, 1934 | 91 | 309,706 | 59 | 211,394 |
| November | 92 | 287,743 | 55 | 205,590 |
| October | 93 | 339,602 | 63 | 234,302 |
| September | 110 | 362,773 | 75 | 238,557 |
| August | 129 | 377,219 | 106 | 363,789 |
| July | 136 | 374,494 | 112 | 392,586 |
| June | 125 | 337,627 | 105 | 316,594 |
| May | 105 | 301,785 | 82 | 245,571 |
| April | 86 | 309,725 | 58 | 227,404 |
| March | 88 | 304,604 | 64 | 259,406 |

### Portland, Me.

(Exclusive of Domestic)

| Month | —Entrances— No. ships | Net tonnage | —Clearances— No. ships | Net tonnage |
|---|---|---|---|---|
| January, 1935 | 12 | 31,676 | 10 | 25,804 |
| December, 1934 | 12 | 24,738 | 16 | 37,026 |
| November | 21 | 41,916 | 19 | 34,399 |
| October | 19 | 34,735 | 17 | 28,611 |
| September | 16 | 35,064 | 15 | 34,285 |
| August | 23 | 31,559 | 21 | 31,672 |
| July | 14 | 27,034 | 12 | 26,525 |
| June | 15 | 30,296 | 16 | 43,232 |
| May | 15 | 27,376 | 15 | 32.378 |
| April | 14 | 20,555 | 15 | 20,572 |

### Providence

(Exclusive of Domestic)

| Month | —Entrances— No. ships | Net tonnage | —Clearances— No. ships | Net tonnage |
|---|---|---|---|---|
| January, 1935 | 2 | 6,682 | 4 | 12,832 |
| December, 1934 | 1 | 2,316 | 3 | 10,988 |
| November | 4 | 9,158 | 2 | 2,192 |
| October | 3 | 11,084 | 1 | 1,901 |
| September | 4 | 13,022 | 2 | 8,628 |
| August | 7 | 12,240 | 5 | 11,809 |
| July | 4 | 11,634 | 4 | 17,821 |
| June | 8 | 14,773 | 4 | 4,887 |
| May | 3 | 4,985 | 1 | 2,022 |
| April | 3 | 4,985 | 1 | 2,022 |

### Portland, Oreg.

(Exclusive of Domestic)

| Month | —Entrances— No. ships | Net tonnage | —Clearances— No. ships | Net tonnage |
|---|---|---|---|---|
| January, 1935 | 34 | 126,730 | 45 | 159,415 |
| December, 1934 | 27 | 107,555 | 49 | 185,192 |
| November | 32 | 129,510 | 44 | 165,914 |
| October | 27 | 104,387 | 47 | 182,669 |
| September | 22 | 83,223 | 41 | 147,290 |
| August | 30 | 119,182 | 49 | 194,079 |
| July | 12 | 46,946 | 11 | 39,730 |
| June | 10 | 34,726 | 1 | 2,298 |
| May | 11 | 41,765 | 17 | 58,993 |
| April | 31 | 117,094 | 42 | 157,954 |
| March | 32 | 121,085 | 50 | 186,817 |

### Baltimore

(Exclusive of Domestic)

| Month | —Entrances— No. ships | Net tonnage | —Clearances— No. ships | Net tonnage |
|---|---|---|---|---|
| January, 1935 | 86 | 276,468 | 88 | 286,810 |
| December, 1934 | 97 | 299,281 | 95 | 309,991 |
| November | 88 | 271,778 | 94 | 288,109 |
| October | 96 | 282,930 | 100 | 308,916 |
| September | 91 | 2.6.111 | 93 | 284,297 |
| August | 92 | 278,812 | 96 | 280,641 |
| July | 108 | 319,702 | 106 | 317,583 |
| June | 108 | 339,280 | 112 | 356,445 |
| May | 104 | 329,312 | 107 | 328,998 |
| April | 102 | 300,396 | 108 | 334,583 |
| March | 92 | 288,061 | 88 | 273,131 |

### Norfolk and Newport News

(Exclusive of Domestic)

| Month | —Entrances— No. ships | Net tonnage | —Clearances— No. ships | Net tonnage |
|---|---|---|---|---|
| January, 1935 | 25 | 99,056 | 51 | 121,578 |
| December, 1934 | 29 | 70,494 | 45 | 116,786 |
| November | 32 | 121,636 | 45 | 113,181 |
| October | 28 | 83,089 | 41 | 102,699 |
| September | 26 | 67,068 | 44 | 107,698 |
| August | 21 | 111,553 | 37 | 113,616 |
| July | 25 | 76,320 | 33 | 91,111 |
| June | 39 | 91,293 | 57 | 127,068 |
| May | 31 | 71,706 | 50 | 103,737 |
| April | 21 | 65,701 | 47 | 125,291 |
| March | 23 | 64,469 | 60 | 151,360 |

### Jacksonville

(Exclusive of Domestic)

| Month | —Entrances— No. ships | Net tonnage | —Clearances— No. ships | Net tonnage |
|---|---|---|---|---|
| January, 1935 | 5 | 12,273 | 10 | 30,335 |
| December, 1934 | 7 | 7,116 | 15 | 33,473 |
| November | 20 | 29,468 | 13 | 25,052 |
| October | 13 | 22,913 | 17 | 32,357 |
| September | 18 | 21,329 | 18 | 24,657 |
| August | 20 | 25,558 | 21 | 37,676 |
| July | 18 | 16,470 | 16 | 18,145 |
| June | 16 | 21,226 | 18 | 30,898 |
| May | 14 | 13,340 | 22 | 38,824 |
| April | 10 | 10,464 | 7 | 12,164 |

### Key West

(Exclusive of Domestic)

| Month | —Entrances— No. ships | Net tonnage | —Clearances— No. ships | Net tonnage |
|---|---|---|---|---|
| January, 1935 | 23 | 27,332 | 24 | 27,651 |
| December, 1934 | 23 | 33,454 | 24 | 33,915 |
| November | 24 | 30,272 | 27 | 32,493 |
| October | 26 | 26,491 | 25 | 26,899 |
| September | 21 | 23,268 | 21 | 23,282 |
| August | 23 | 24,392 | 24 | 24,706 |
| July | 25 | 24.469 | 25 | 25,564 |
| June | 28 | 33,701 | 25 | 32,548 |
| May | 40 | 57,180 | 42 | 58,094 |
| April | 28 | 36,197 | 21 | 36,066 |

### Mobile

(Exclusive of Domestic)

| Month | —Entrances— No. ships | Net tonnage | —Clearances— No. ships | Net tonnage |
|---|---|---|---|---|
| January, 1935 | 104 | 270,423 | 101 | 241,901 |
| December, 1934 | 95 | 203,188 | 90 | 196,487 |
| November | 89 | 201,492 | 95 | 222,543 |
| October | 109 | 278,352 | 107 | 266,966 |
| September | 102 | 228,304 | 115 | 260,544 |
| August | 108 | 256,663 | 101 | 237,852 |
| July | 102 | 221,011 | 99 | 225,308 |
| June | 119 | 254,040 | 115 | 237,054 |
| May | 115 | 255,503 | 114 | 253,294 |
| April | 113 | 254,839 | 103 | 239,371 |

### Seattle

(Exclusive of Domestic)

| Month | —Entrances— No. ships | Net tonnage | —Clearances— No. ships | Net tonnage |
|---|---|---|---|---|
| January, 1935 | 56 | 212,386 | 63 | 249,805 |
| December, 1934 | 51 | 222,427 | 47 | 201,642 |
| November | 46 | 185,293 | 48 | 205,795 |
| October | 54 | 230,438 | 55 | 222,014 |
| September | 45 | 184 361 | 43 | 221,241 |
| August | 43 | 176.644 | 54 | 223,038 |
| July | 24 | 93 558 | 20 | 82,646 |
| June | 16 | 73,128 | 12 | 52,309 |
| May | 22 | 103,441 | 19 | 86,295 |
| April | 62 | 264,608 | 67 | 278,172 |

### New Orleans

(Exclusive of Domestic)

| Month | —Entrances— No. ships | Net tonnage | —Clearances— No. ships | Net tonnage |
|---|---|---|---|---|
| December, 1934 | 172 | 472,463 | 174 | 477,672 |
| November | 157 | 431,288 | 157 | 430,060 |
| October | 175 | 499,832 | 177 | 492,802 |
| September | 159 | 453,453 | 157 | 426,341 |
| August | 145 | 385,557 | 154 | 403,163 |
| July | 156 | 439,297 | 154 | 423,642 |
| June | 141 | 300,349 | 151 | 416,734 |
| May | 167 | 482,123 | 152 | 421,839 |
| April | 169 | 487,655 | 170 | 475,121 |
| March | 155 | 422,855 | 166 | 449,394 |
| February | 151 | 446,952 | 145 | 414,515 |

### Charleston

(Exclusive of Domestic)

| Month | —Entrances— No. ships | Net tonnage | —Clearances— No. ships | Net tonnage |
|---|---|---|---|---|
| November, 1934 | 43 | 128,750 | 39 | 112,755 |
| October | 47 | 165,814 | 37 | 105,739 |
| September | 35 | 102,325 | 28 | 80,390 |
| August | 32 | 97,695 | 36 | 97,663 |
| July | 41 | 99,233 | 34 | 81,362 |
| June | 36 | 95,072 | 31 | 81,094 |
| May | 36 | 98,475 | 23 | 69,764 |
| April | 38 | 101,315 | 34 | 96,705 |
| March | 44 | 131,839 | 37 | 109,492 |
| February | 40 | 112,884 | 39 | 109,597 |

### Galveston

(Exclusive of Domestic)

| Month | —Entrances— No. ships | Net tonnage | —Clearances— No. ships | Net tonnage |
|---|---|---|---|---|
| January, 1935 | 15 | 29,620 | 58 | 166,087 |
| December, 1934 | 20 | 29,298 | 58 | 157,843 |
| November | 22 | 43,980 | 71 | 255,378 |
| October | 16 | 29,015 | 70 | 207,637 |
| August | 12 | 21,967 | 55 | 160,727 |
| July | 21 | 33,508 | 60 | 163,282 |
| June | 25 | 57,920 | 71 | 215,594 |
| May | 21 | 34,457 | 56 | 141,885 |
| April | 27 | 50,294 | 82 | 219,283 |
| March | 29 | 54,379 | 94 | 264,101 |

### Los Angeles

(Exclusive of Domestic)

| Month | —Entrances— No. ships | Net tonnage | —Clearances— No. ships | Net tonnage |
|---|---|---|---|---|
| December, 1934 | 239 | 899,269 | 222 | 882,697 |
| November | 226 | 870,032 | 210 | 878,186 |
| October | 225 | 856,732 | 203 | 825,348 |
| September | 214 | 804,221 | 197 | 791,324 |
| August | 218 | 801,482 | 201 | 785,671 |
| July | 198 | 710,210 | 186 | 755,686 |
| June | 201 | 743,198 | 186 | 738,880 |
| May | 200 | 754,695 | 197 | 738,307 |
| April | 186 | 696,716 | 167 | 679,883 |
| March | 168 | 669,548 | 169 | 691,230 |

### San Francisco

(Exclusive of Domestic)

| Month | —Entrances— No. ships | Net tonnage | —Clearances— No. ships | Net tonnage |
|---|---|---|---|---|
| January, 1935 | 142 | 638,652 | 162 | 672,411 |
| December, 1934 | 152 | 659,210 | 154 | 628,137 |
| November | 151 | 664,456 | 175 | 733,150 |
| October | 152 | 670,992 | 156 | 663,353 |
| September | 146 | 614,180 | 160 | 675,941 |
| August | 160 | 699,105 | 178 | 781,553 |
| July | 118 | 484,655 | 119 | 471,702 |
| June | 126 | 386,966 | 110 | 456,027 |
| May | 152 | 452,827 | 140 | 593,715 |
| April | 165 | 831,501 | 169 | 729,273 |

### Houston

(Exclusive of Domestic)

| Month | —Entrances— No. ships | Net tonnage | —Clearances— No. ships | Net tonnage |
|---|---|---|---|---|
| December, 1934 | 45 | 159,040 | 47 | 166,241 |
| November, | 39 | 143,055 | 39 | 139,616 |
| October | 43 | 145,461 | 41 | 139,418 |
| September | 49 | 169,676 | 49 | 170,694 |
| August | 19 | 76,104 | 22 | 88,631 |
| July | 24 | 93,810 | 24 | 86,702 |
| June | 27 | 115,730 | 33 | 133,108 |
| May | 29 | 109,223 | 45 | 132,318 |
| April | 31 | 121,318 | 40 | 155,327 |
| March | 23 | 89,200 | 39 | 144,546 |

Note: At the port of Philadelphia, additional vessels in the foreign trade (via other American ports) were 62 of 204,289 net tons entered and 75 of 254,139 net tons cleared for the month of January. Similarly at Norfolk and Newport News 113 vessels of 330,703 net tons entered and 85 vessels of 281,366 net tons cleared during January in foreign trade via other American ports.

# Latest Data on New Marine Work

### Information on New Ships Ordered—Building and Repair Contracts Let — Sales — Reconditioning — Launchings — Trial Trips

THE coast and geodetic survey has plans for a diesel electric, steel hull, survey vessel for use along the Washington and Oregon coasts. Specifications call for a length of 117 feet, beam 25 feet and depth 8 feet, with a displacement of about 300 tons. Bids have not yet been asked for the construction of the hull but it is understood that award of contract will be made prior to June 30. Tenders for the two diesel drive generating sets are to be opened by the United States engineers, Portland, Ore., on March 8.

## Ask Bids for Large Dam

It is expected that plans and specifications for the construction of dam No. 26, Mississippi river, will be issued about March 1 and that bids will be received about April 1, by the United States engineer office, St. Louis. The site of the work contemplated is in the Mississippi river and on the Missouri shore opposite Alton, Ill., about 23 miles up stream from St. Louis, and about 303 miles upstream from the mouth of the Ohio river. The work is adjacent to the Alton locks which are now under construction by John Griffiths & Son Co., Chicago.

The dam as contemplated will consist of 30 Tainter gates and 3 roller gates. The Tainter gates will be 30 feet in height and 40 feet in length, and the roller gates 25 feet in height and 80 feet in length. The gates will operate between concrete piers. All Tainter and roller gates will be raised and lowered by means of chains operated by electric hoists. The length of the movable section of the dam will be 1724 feet. The estimated time of completion is 800 days.

## Bids for Diesel Engines

All bids received on Dec. 11 by the United States engineer office, Louisville, Ky., from eight diesel engine building companies for furnishing two 750-horsepower diesel propelling engines, and one 575-kilowatt diesel driven generating set have been rejected. Also rejected were the bids received on the same day by the same office from three diesel engine building companies for furnishing one 1600-horsepower diesel engine for dredge pump drive.

New specifications have been issued for the two diesel propelling engines, the diesel driven generating set and the large diesel engine for pump drive. The new bids were to be opened on Feb. 27.

## Radio for Seven Trawlers

The Mackay Radio & Telegraph Co., recently equipped seven trawlers owned by R. O'Brien & Co., Boston, with radiotelegraph apparatus. The trawlers are the QUINCY, DORCHESTER, WILLIAM J. O'BRIEN, WINTHROP, THOMAS WHALEN, ATLANTIC and PLYMOUTH, the last three being new vessels recently completed.

Ship to shore and ship to ship radio communication has become virtually a practical necessity in the fishing industry. When trawlers are able to keep the shore organizations fully informed, the marketing advantage is a factor of considerable importance. Also when trawlers of the same company can inter-communicate by radio, those finding the best runs can direct others to better fishing grounds. The effect of radio in this way on the overall production of a fleet has been exceedingly important.

Radio has proved a valuable aid also in navigating since trawlers so equipped are able to determine their exact position through radio bearings taken on radio compass stations ashore.

## Big Dredge Renovation

Work is well under way at the yards of the Manitowoc Shipbuilding Corp. on the complete remodeling at a cost of between $250,000 and $350,000 of the large suction dredge INDIANA purchased from the Hydraulic Dredging Co., Oakland, Calif., by the Great Lakes Dredge & Dock Co. some time ago, and operated last summer on a government contract at Monroe, Mich. The 1500-horsepower reciprocating engine will be replaced by a 5000 h. p. Elliott turbine, contract for which has been let to the Bucyrus-Erie Co., South Milwaukee, Wis. New Babcok & Wilcox marine watertube boilers also are being installed. The dredge is expected to be ready by spring to resume its work at Monroe.

Towing the 206-foot dredge the 8800 miles from the Pacific ocean to the Great Lakes was accomplished by several tugs. The dredge was towed from San Francisco to Colon, Canal Zone, by the SEA RANGER of San Francisco, thence to Montreal by the SUSAN MORAN of New York. At Montreal the dredge was turned over to Great Lakes tugs which took it to Monroe, and then to Manitowoc last fall for rejuvenation and added power. The elapsed time from San Francisco, including a two months' layover in New York, was seven months. The towing bill was about $100,000.

## Use Air Conditioning

Ships of the Standard Fruit & Steamship Co., flying the Honduras flag, will in the future protect cargoes of fruits, consisting mostly of bananas, with American air conditioning. Engineers of the Trane Co., La Crosse, Wis., after a careful study of the unusual conditions of service have designed a system whereby forced air circulation through the holds, introduces fresh air necessary to keep the fruit from spoiling. Huge cooling coils are also installed in the holds and these use steam from the ship's boilers as a cooling medium, through the usual steam jet system popular on American railroads.

The coils employed in the first of these ships to be conditioned are 18 feet in length and about 5 feet high. They are perhaps the largest coils for this purpose ever to be installed in a ship. Through the operation of these coils, the fruit will be kept at a predetermined and correct temperature from the time it leaves Central America until unloaded for our markets.

## To Build Two Barges

Treadwell Construction Co., Midland, Pa., was the low bidder, at $30,960 and 50 days time of delivery, for two 100 x 30 x 6 feet barges for the United States engineers. The bids were opened Feb. 5 on specifications issued from Washington.

Maryland Dry Dock Co., Baltimore, was second low bidder at $32,560 and 60 days time of delivery, followed by Federal Shipbuilding & Dry Dock Co., Kearny, N. J., at $32,760 and 120 days time.

## Two New Ships Planned for South African Line

Deciding to go ahead at once with the plan, which has been under consideration for a year, to build a new vessel for the American South African line, application was made to the shipping board bureau on Feb. 14 for a construction loan. Under the terms of the merchant marine act of 1928, a loan of 75 per cent of the cost is allowed, with the proviso that the owner shall supply the first 25 per cent in cash. The new unit is to be a fast combination passenger and cargo vessel for the New York-South African service of the company on its ocean mail contract route No. 6. Consideration is also being given to the building of a second new vessel. Plans and specifications, it is understood, prepared by Gibbs & Cox Inc., New York naval architects, have been ready for sometime.

The necessities of service now call for definite action and the line intends to go ahead with the building program in the belief that a strong merchant marine policy will shortly be inaugurated by the government.

James A. Farrell Jr., president of the American South African Line, made the following statement in connection with the proposal:

"While it is the definite purpose of the company to construct one new vessel immediately, it is expected also that competitive prices will permit the laying down of a second vessel at the same time. These in conjunction with the motorship CITY OF NEW YORK, recently constructed will provide a fast frequent service.

"The construction of such vessels would add to the naval auxiliary service and would provide employment for a great number of American workmen."

It is understood that the new vessels now proposed will have the same general characteristics as the CITY OF NEW YORK, though there are sure to be some important variations and innovations. General characteristics of the CITY OF NEW YORK are as follows: Length overall, 470 feet, 9 inches; beam molded, 61 feet, 6 inches; depth molded, 37 feet; draft loaded, 26 feet; displacement loaded, 15,000 tons; gross tonnage, 8272; passenger capacity, first class, 61; cargo capacity, in cubic feet, 449,055 bales; and speed, 14 knots. Propulsion is by means of twin screws, each direct connected to a 2700 horsepower at 100 revolutions per minute, 4-cylinder, Sun-Doxford, opposed piston diesel engine. The CITY OF NEW YORK was completed on Jan. 17, 1930 by the Sun Shipbuilding & Dry Dock Co., Chester, Pa.

In the new vessel or vessels, now to be undertaken, steam as well as diesel drive is being considered. It is likely that the speed will be stepped up somewhat.

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## Ask Lay-up of Leviathan, To Build New Vessel

The Roosevelt-International Mercantile Marine Co. has made formal application to the shipping board bureau for permission to discontinue the required service of the LEVIATHAN in the transatlantic trade of the United States lines. The question whether or not the LEVIATHAN should be continued in service is considered of such importance that President Roosevelt himself is likely to decide the issue.

If the application is granted, the losses, of more than $500,000 a year, which the operation of the liner involves, will be applied to the immediate construction of a new vessel for service with the WASHINGTON and MANHATTAN. The building of such a vessel at this time as a necessary addition to a well established and profitable service would be a practical move of definite value in the program to promote recovery. It would involve the expenditure of perhaps eleven to twelve million dollars and many industries outside of the shipyard where the vessel is to be built would be benefited.

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Until 11 a.m., March 6, the United States engineer office, Kansas City, Mo., will receive bids for the construction and delivery afloat of one 250 horsepower survey boat.

## Ferry for Erie Awarded to Sun Shipbuilding

Word has been received that the Sun Shipbuilding & Dry Dock Co., Chester, Pa., was notified on Feb. 18 of the award of contract to build the new ferry for the Erie railroad, bids on which were opened Jan. 3 at the offices of the Erie Railroad Co., Cleveland. An account of the bids opened at that time was published in the February MARINE REVIEW. The contract calls for a price of about $500,000 and delivery in 180 days after details of the contract have been arranged.

The new ferry is to be of steel construction, double ended, with screw propellers at each end. Length overall over guards will be 234 feet; length between perpendiculars, 193 feet; breadth extreme over guards, 64 feet; breadth molded of hull at waterline, 40 feet; breadth molded of hull at deck, 45 feet; and depth molded, 18 feet, three inches.

The alternate proposal of unaflow engine and two coal burning watertube boilers was accepted. The main engine, to be supplied by the Skinner Engine Co., Erie, Pa., will be a unaflow steam reciprocating engine developing normally 1500 indicated horsepower at 130 revolutions per minute and a maximum of 1700 indicated horsepower at 135 revolutions per minute, operating on a steam pressure of 175 pounds.

Steam for all purposes will be supplied by two coal burning marine watertube boilers of 200 pounds per square inch pressure, operating at 175 pounds per square inch working pressure and 100 degrees superheat. Each boiler will supply 13,500 pounds of steam per hour with feed temperature to the boiler 170 degrees Fahr. at 175 pounds gage pressure.

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The United States engineer office, Customhouse, Philadelphia, will receive bids until 2 p.m., March 6, 1935 for the construction and delivery afloat of one 50-foot steel hull diesel driven tug.

## Bunker Prices

### At New York

| | Coal F. a. s. per ton | Fuel oil alongside per barrel | Diesel engine oil alongside per gallon |
|---|---|---|---|
| Feb. 19, 1935 | 5.63@5.38 | 1.20 | 4.65 |
| Jan. 19 | 5.63@5.38 | 1.20 | 4.65 |
| Dec. 19 | 5.63@5.38 | 1.20 | 4.65 |
| Nov. 19 | 5.63@5.48 | 1.20 | 4.65 |
| Oct. 19 | 5.63@5.48 | 1.20 | 4.65 |
| Sept. 19 | 5.63@5.48 | 1.35 | 4.79 |
| Aug. 18 | 5.63@5.48 | 1.35 | 4.79 |
| July 19 | 5.63@5.48 | 1.35 | 4.79 |
| June 19 | 5.63@5.48 | 1.35 | 4.79 |
| May 18 | 5.63@5.48 | 1.35 | 4.79 |
| April 19 | 5.63@5.48 | 1.35 | 4.79 |
| Mar. 19, 1934 | 5.35@5.20 | 1.25 | 4.79 |

### At Philadelphia

| | Coal trim in bulk per ton | Fuel oil alongside per barrel | Diesel engine oil alongside per gallon |
|---|---|---|---|
| Feb. 19, 1935 | 4.93@4.68 | 1.20 | 4.61 |
| Jan. 19 | 4.93@4.68 | 1.20 | 4.61 |
| Dec. 19 | 4.93@4.68 | 1.20 | 4.61 |
| Nov. 19 | 4.93@4.78 | 1.20 | 4.61 |
| Oct. 19, | 4.93@4.78 | 1.20 | 4.61 |
| Sept. 19 | 4.93@4.78 | 1.35 | 4.76 |
| Aug. 18 | 4.93@4.78 | 1.35 | 4.76 |
| July 19 | 4.93@4.78 | 1.35 | 4.76 |
| June 19 | 4.93@4.78 | 1.35 | 4.76 |
| May 18 | 4.93@4.78 | 1.35 | 4.76 |
| April 19 | 4.93@4.78 | 1.35 | 4.76 |
| Mar. 19, 1934 | 4.65@4.50 | 1.25 | 4.76 |

### Other Ports

Feb. 19, 1935

| | |
|---|---|
| Boston, coal, per ton | $6.27 |
| Boston, oil, f. a. s. per barrel | $1.17 |
| Hampton Roads, coal, per ton, f.o.b. piers | $4.75 |
| Cardiff, coal, per ton | 13s 9d |
| London, coal, per ton | —s —d |
| Antwerp, coal, per ton | 15s 9d |
| Antwerp, Fuel oil, per ton | —s —d |
| Antwerp, Diesel oil, per ton | —s —d |
| British ports, Fuel oil | —s —d |
| British ports, Diesel oil | —s —d |

## Collision Sinks S. S. Mohawk With Loss of 45 Lives

The S. S. MOHAWK, chartered by the Ward line from the Clyde-Mallory line, to take the place of the S. S. HAVANA lost on a Bahama reef, Jan. 6, sank 4 miles off Bayhead, N. J., after a collision about 9:20 p. m. Jan. 24, with the Norwegian freighter TALISMAN. Fifteen passengers, and 30 of the crew of the MOHAWK lost their lives. The TALISMAN was not badly damaged.

The MOHAWK sailed from Pier 14, East river at 4 p. m., bound for Havana and Mexican ports with 54 passengers and 110 in the crew, and proceeded down the coast with the weather clear and cold and a northwest wind blowing. The TALISMAN sailed from New York at 5 p. m. for South American ports. Later off the Jersey coast the two vessels, headed in the same direction, were on parallel courses, the TALISMAN somewhat further offshore.

Due to some difficulty with the telemotor steering gear on the MOHAWK, it was cut out and the vessel was steered directly from the steering engine room aft with orders communicated from the bridge to this location by telegraph. Thereafter the MOHAWK sheered to port, although the instructions from the bridge were to change the course to starboard. The danger signal was sounded. Again the officer on the MOHAWK'S bridge signaled the steering engine room aft to change to starboard, and also ordered the engine's reversed to full speed astern. She continued, however, swinging to port toward the TALISMAN and the TALISMAN'S stem cut into the MOHAWK'S port bow, penetrating deep into her side. When the TALISMAN backed clear, the starboard side of her bridge broke the port wing of the MOHAWK'S bridge and disabled the engine room telegraph.

An S.O.S. was sent out; lifeboats were lowered, and as far as ascertained, all passengers entered lifeboats and were put off. The MOHAWK sank at 10:30 p. m. with the master Capt. J. E. Wood and the third officer on the bridge, both going down with the ship.

The Clyde Mallory liner ALGONQUIN and the United Fruit Liner LIMON, standing by in response to the S.O.S., took on board 40 passengers and 80 members of the crew from the MOHAWK'S lifeboats. One passenger died of heart disease during the confusion. Bodies of 13 passengers and 21 members of the crew have been recovered. One passenger and 9 members of the crew are missing and have been given up for dead.

The United States steamboat inspection service has been holding an inquiry to fix the responsibility for the disaster, and an investigation was also conducted by the United States attorney to determine whether criminal negligence was involved.

From reports of this disaster the officers and crew carried out their duties with courage and efficiency after the accident. It is now apparent that the accident was caused by confusion in understanding the signals from the bridge by the man at the wheel at the emergency steering station, and it brings out the utmost importance of unmistakable clarity in helm orders.

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## Safety Conference Meets

The sixth annual greater New York safety conference will be held under the auspices of the National Safety council at the Pennsylvania hotel, New York City, March 5 to 7.

Prof. H. L. Seward, Yale university, will preside as chairman at the marine section, which will hold its meeting at 2:15 p.m., March 6.

The following papers are to be presented: *Organization for Safety at Sea*, by Samuel Aitken, vice president, Moore & McCormack Co., New York City; *Pier Fire Hazards*, by John J. McElligott, fire chief and commissioner, New York City; and *The Underlying Psychology of the Stevedoring Problem*, by Frank E. Ames, manager, safety department, Lykes Bros. Ripley Steamship Co., New Orleans.

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The Texas Co., New York, has prepared a complete set of 1935 cruising charts of the Atlantic coast. Under preparation are also cruising charts for Great Lakes and Hudson river.

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## Labor Dispute Settled, Upholding Shipyard

The national labor relations board, on a complaint and petition for election of the industrial union of marine and shipbuilding workers of America, on behalf of employes at the Fore River plant of the Bethlehem Shipbuilding Corp. Ltd., Quincy, Mass., on Feb. 14 decided that the union affiliations of three men had nothing to do with their lay-off; that the men were laid off due to lack of work resulting from a stop work order on certain main condensers in the boiler shop, issued by the engineering department, because of a change in design which had to be submitted to Washington.

The board also denied the union's petition for an election at the Fore River plant. After reviewing the evidence as to the strength the union has mustered at the plant, the board has concluded that, "an election at this time would in all likelihood merely result in confirming the status quo."

An employes' representative plan has been in effect at the Fore River plant since 1923.

## Shipping Conference Ends Preliminary Meeting

The preliminary conference of shipowners which convened in London Jan. 14 completed its deliberation and the delegates from the various nations returned home to present their reports to their respective organizations. R. J. Baker, president of the American Steamship Owners' association, represented that association and the United States as a delegate.

This preliminary meeting of shipping representatives had been called to prepare an agenda for the international shipping conference which, it is expected, will be held at London in April. At that conference an attempt will be made to come to an agreement on the rationalization of shipping with the view of stabilization and a reasonable increase in rates.

The British government in proposing a temporary subsidy for British tramp shipping in July, 1934 made it a condition that British owners should consult their colleagues in other countries with a view to framing proposals tending "to adjust the supply of tonnage in the world to the demand and thus to raise freight rates once more to a remunerative level." Consultations since then between shipowners of the world resulted in this preliminary conference which concluded its sessions on Jan. 19.

The conference was mindful of the fact that the level of freight rates in relation to pre-war is even lower than that of wholesale prices; that the shipping industry is being grievously and unfairly injured, and that ships are wearing out without proper provision for replacement.

In these circumstances the preliminary conference concentrated on the task of preparing a draft scheme which might be likely to receive the greatest common measure of support but without in any way committing the shipowning organizations represented at the conference. The various shipowning organizations in each country will examine the proposals made by the preliminary conference and will express their opinion on these proposals with a view to further consideration by a fully constituted meeting of the international shipping conference, preceded, if necesary, by a further preliminary meeting.

It was emphasized at the preliminary conference that the depression in shipping due, as it is, to the general economic difficulties of the world tends through its manifold reactions to increase such world economic difficulties. The conference, therefore, strongly urged the governments of the world to intensify their constructive efforts to find a solution of the difficulties now standing in the way of a general restoration of international trade.

# CHICAGO,

## Foreign Trade by Water Shows Increase

BY W. G. GUDE

WHILE generally regarded as an inland point, Chicago, by virtue of its outlet through the Great Lakes, carries on a relatively heavy trade with foreign ports. Imports and exports of the Chicago district by water last year were valued at $17,165,002, compared with $16,332,174 in 1933, according to the annual report of the collector of customs at Chicago. These figures do not include cargoes moved over the Illinois waterway and Mississippi river, since such shipments, if foreign in origin or in final destination, would be cleared at the Gulf rather than at Chicago.

Imports are substantially heavier than exports, incoming shipments last year amounting to 866,438,966 pounds, with a value of $12,651,308, while exports from Chicago and nearby points of East Chicago and Gary, Ind., were valued at $4,513,694. This compares with imports of $11,059,245 and exports of $5,272,929 in 1933. About 90 per cent of this freight was carried by foreign vessels.

Some 295 merchant ships entered the Chicago port in 1934, this figure including a number of repeat trips for most of the vessels. Ships flying foreign flags were more numerous than during any previous year, however, there being in all 20 ships of other than United States registry that used Chicago's harbor. This was twice the number that arrived in 1933. Principal foreign lines touching the Chicago port included the Tree Line Navigation Co., Montreal, the Newfoundland Canada Steamship Ltd., Halifax, and the Canada Atlantic Transit.

Chicago's Foreign Trade 1934

**Imports**

| | Weight, Pounds | Value |
|---|---|---|
| Newsprint paper.... | 289,064,434 | $ 5,405,503 |
| Grain ..... | 463,427,911 | 3,849,753 |
| Food products..... | 18,913,254 | 1,140,044 |
| Flaxseed ..... | 16,089,132 | 603,898 |
| Metals and ores..... | 32,662,212 | 481,389 |
| All others ..... | 46,282,023 | 1,170,721 |
| **Total** ..... | **866,438,966** | **$12,651,308** |

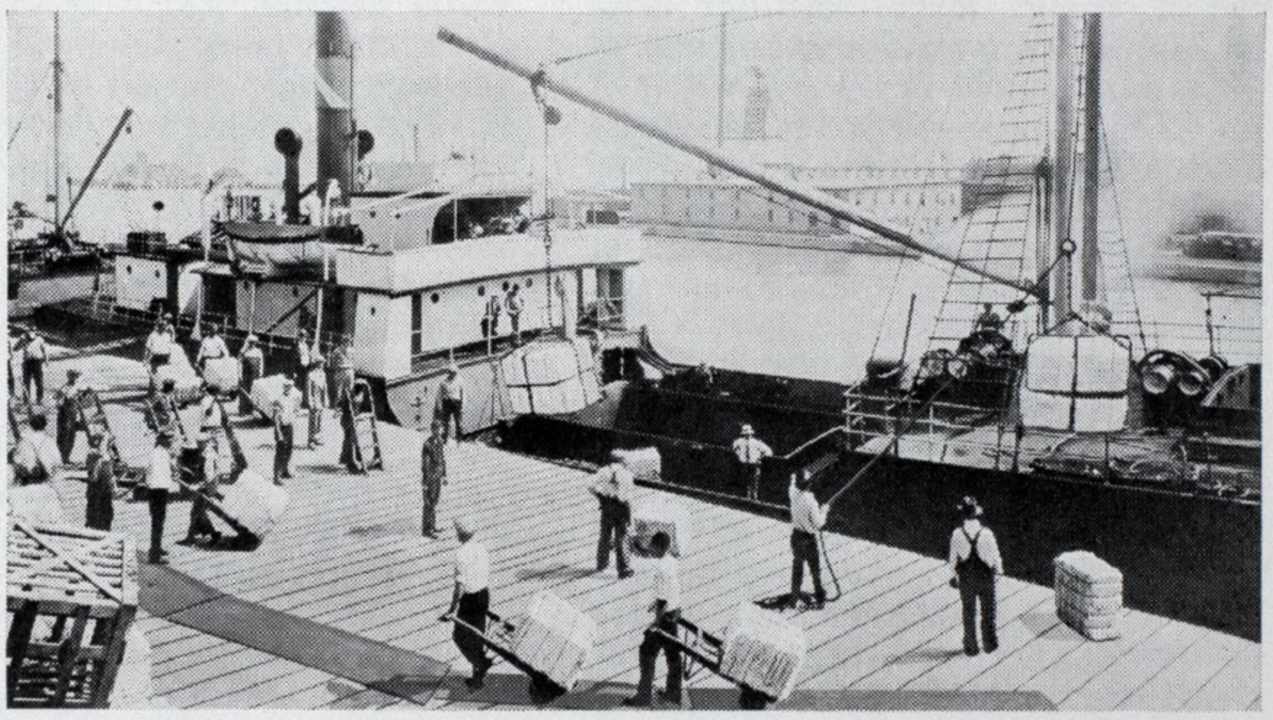
**Exports**

| | Quantity | Value |
|---|---|---|
| Corn (bushels) ..... | 1,567,358 | $1,154,957 |
| Lard (pounds) ..... | 13,364,516 | 913,618 |
| Iron, steel (tons)..... | 13,976 | 594,971 |
| Coke (tons) ..... | 53,757 | 391,962 |
| Pork (pounds) ..... | 4,451,547 | 320,640 |
| All others ..... | ..... | 1,137,546 |
| **Total** ..... | ..... | **$4,513,694** |

Leading commodities exported last year, in order of their relative importance, were corn, lard, iron and steel products, coke, pork, coal tar pitch, glucose corn syrup, animal hair, printing presses and linseed cake. The first five of these accounted for about 75 per cent of the total exports. Corn shipments amounted to $1,154,957, with the lard movement valued at $913,618. Most of the exports from Chicago are destined for the United Kingdom, Canada taking a large portion of a variety of commodities, while Great Britain has been the best customer for lard. The movement of lard dropped sharply last year, however, comparing with exports of $2,079,203 in 1933, but activity in most other products increased.

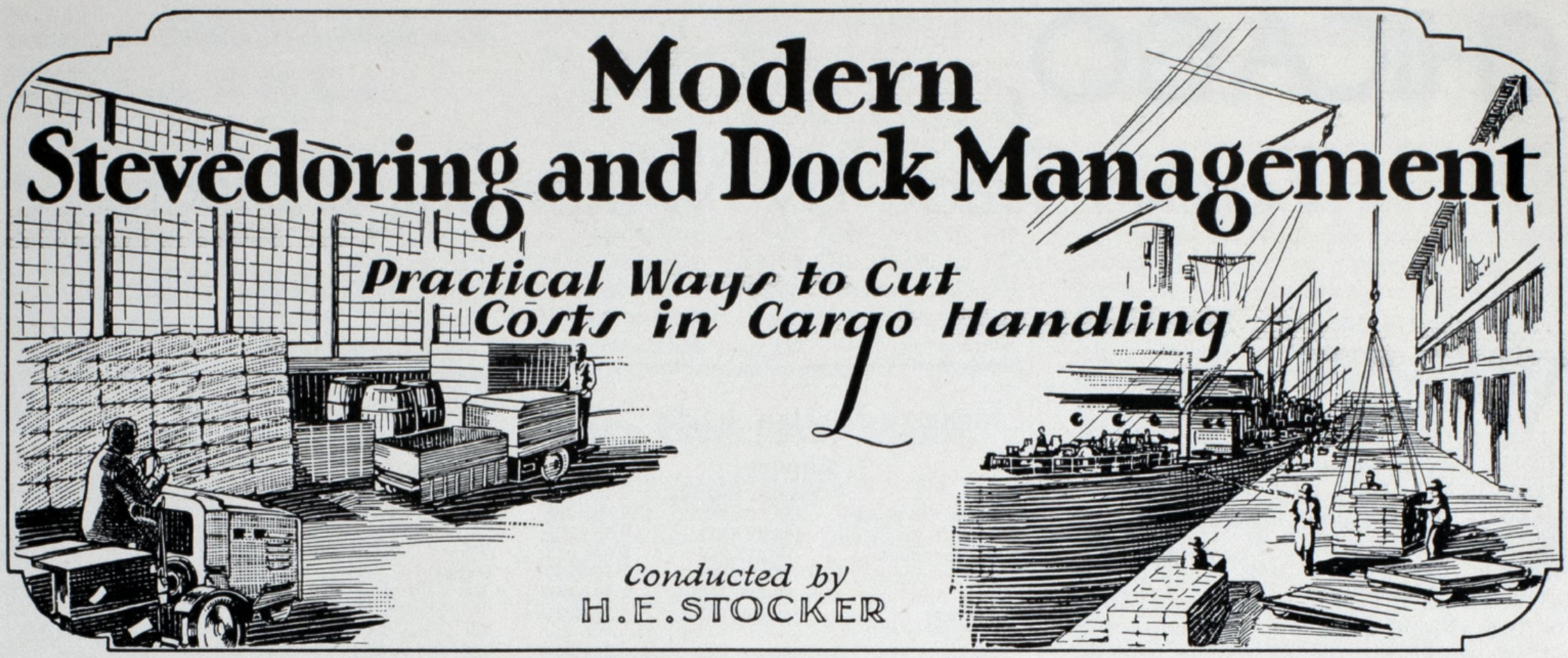
Exports of iron and steel products and coke are relatively heavy, these commodities ranking third and fourth, respectively, in 1934 in the list of all shipments. Most of the iron and steel moves directly from East Chicago and Gary, Ind., because of the location of producing plants at those points. Last year 13,976 tons of iron and steel, with a value of $594,971, were exported from the Chicago district. This compares with 1933 shipments of 9075 tons valued

(*Continued on Page* 40)



*Above—Unloading bales of wood pulp at North Pier Terminal, Chicago. Shipped from Sweden to Chicago direct, via the St. Lawrence river, without trans-shipment, in the steamship Hansa, a Norwegian owned vessel*

*At side—Unloading newsprint paper at the plant of the Chicago Daily News on the Chicago river. This newsprint comes from Canadian mills and is transported in the American vessel Steel Electrician*




# Apply Modern Scientific Principles To Brooklyn Intercoastal Terminal

By Gerard E. Mc Namara

THE application of scientific principles to terminal management is exemplified in the operation of the Brooklyn Intercoastal terminals by the Steamship Terminal Operating Co., New York. This company has leased a ten-acre water front property, which includes open and covered storage space, four covered piers and one warehouse and has set out to develop what promises to be one of the finest intercoastal terminals on the Atlantic seaboard for handling lumber and general cargo.

The terminal is located on the East river, in the Greenpoint section of Brooklyn. Directly across the river, any point along the Manhattan waterfront is easily accessible by lighters and barges. A short distance north of the terminal the Queensboro bridge affords a convenient access to Manhattan by motor trucks. The Queensboro plaza, at the Brooklyn end of the bridge, is a focal point from which good roads make deliveries to the North shore and central portions of Long Island speedy and convenient. Farther south the Williamsburg, Manhattan and Brooklyn bridges likewise afford excellent routes to the heart of Manhattan. Greenpoint, is a typically industrial area and thus does not present so serious a traffic problem to motor trucks as more densely populated and residential sections.

It is expected that much of the lumber moving in the intercoastal trade destined for markets in New York and Long Island will move through this terminal and provisions have been made for the rapid and economical handling of such cargoes. The fine roads and excellent harbor facilities determined the selection of this site in preference to many others available along the Brooklyn waterfront.

### Huron Street Pier

On the north side, the Huron street pier of the terminal is 489 feet long, while on the south its length is 423 feet. The width is 75 feet, and the depth of water in each of the available berths is about 30 feet, adequate draft for the type of vessels which will use the facilities at the terminal. Two berths are provided, the ships docking at the piers averaging 400 feet in length. This pier is entirely covered by a steel shed which is equipped with sliding ports measuring 20 x 28 feet.

The roof of the shed carries two double rows of windows arranged in the center in the form of an inverted "V". These windows, which are set in steel frames, are kept clean to permit light to enter the shed, thus providing admirable working conditions. The floor of the pier is of wooden construction. The shed is used for the storage of dressed lumber and general cargo, although when the terminal has been fully developed its use as a place for storage of lumber will probably be restricted. Seven days free time is allowed on all lumber handled at the terminal.

The length of the India street pier is 458 feet on the north side and 468 feet on the south. It is 60 feet wide and provides two berths for ships having draft up to about 30 feet. The deck is of concrete, which furnishes an excellent surface for speedy operation of the Ross lumber carriers which are used to take the drafts of lumber from the ship's side.

At the present time this pier is partially covered by the remains of the steel shed which was originally erected when the pier was first constructed. Large portions of the shed, however, have been removed, including all of the 20 x 28 feet doors excepting a few at the offshore end of the pier which remain intact and which serve as a storage space for empty lumber blocks and other gear used at the terminal. The bulkhead erection is also complete. Openings, measuring 20 x 28 feet, have been cut in the roof in way of the hatches of various types of ships using the wharf. These openings facilitate the landings of drafts of lumber from the vessels. The drafts can be landed about 10 feet in from the stringpiece on the pier and thus placed in an advantageous position for pick up by the Ross carriers.

Plans for the further development of this pier call for the com-

plete removal of the entire shed, including the bulkhead erections. This will make the pier an open one, ideal for the handling of drafts of lumber which vary greatly in length. The steel salvaged from the demolition of the pier shed will be used to erect a transit shed for dressed lumber in one corner of the transit yard.

### Java Street Pier

This pier has a north side length of 539 feet and a south side length of 557 feet. The width of the pier is 80 feet and the depth of water at its two berths averages 30 feet. The pier is entirely covered by a steel shed, the sliding ports of which measure 20 x 28 feet. The deck is of concrete construction. Like the Huron street shed, two double rows of windows are fitted into the center of the roof in the form of an inverted "V". This allows plenty of natural light to filter through to the inside of the shed and makes artificial lighting unnecessary during the daylight hours.

This pier, at the present time, is used for the temporary storage of lumber requiring protection from the elements and for the storage of general cargo carried by the lumber ships visiting the terminal. The Ross carriers also use this shed as a garage when not in use. Ships discharge cargo direct to this pier when a berth at the India street pier is not available.

### Kent Street Pier

The Kent street pier is 560 feet long on both north and south sides, and is 60 feet wide. The depth of water at the north berth is 30 feet. The south berth is used at the present time by the International Milling Co. Lighters and barges tie up on the south side of this pier as the slip is too narrow for use by ocean going vessels. At all the other piers a slip 200 feet wide is provided.

The steel shed on the Kent street pier measures 30 feet in width from the north side. This leaves an uncovered space 30 feet wide on the south side of the shed. Both the covered and open portions of the deck are of concrete. The roof of this shed has the same type of windows in the roof as have the Huron and Java street piers. The shed is now used chiefly for the temporary storage of flour.

While no definite plans have been advanced for such a development, it is expected that the city of New York will some day abandon the Greenpoint ferry slip, which is on the south side of the Kent street pier. If this is done it will present an opportunity of widening the slip on that side of the pier so that ocean going carriers can dock alongside the 30-foot apron. If this is done the utility of the Kent street pier will be greatly increased as far as the terminal as a whole is concerned.

The area north of Huron street is utilized as a storage-in-transit area, capable of holding 56,000 square feet of lumber. The lumber is crane-piled by steam locomotive cranes having a capacity of 10 tons. These cranes, which run along tracks the entire length of the yards, have booms 60 feet in length. Plans call for the removal of the tracks and crossovers in the yard because of the extra space necessitated by the tracks which must be laid on the ground in addition to the normal motor truck passages. The cranes will be equipped with caterpillar type traction which will make them more flexible and available for service in any part of the yard. This area is soon to be covered by a steel shed which is to be built of steel taken from the India street pier.

From Huron street, another storage area extends southward to India street. This yard has a capacity of 100,000 feet of lumber, and is divided into three sections by two sets of tracks for the two 10-ton steam locomotive cranes which serve the area. Switching tracks are provided at the eastern end of the yards so that the cranes may be moved about quite readily. These tracks are likewise to be removed and the two 10-ton cranes will be equipped with caterpillar traction to provide greater flexibility.

In addition to the 10-ton steam-driven cranes, a 7-ton gas tractor of the caterpillar type is also available for use anywhere in the yard.

At the present time that portion of the yard extending from India street to Java street, and from the bulkhead line to West street, is also an uncovered storage yard. Plans have been made, however, and construction of a large warehouse is soon to start. This warehouse will measure 250 x 525 feet and will provide storage space for 100,000 square feet of lumber. From Java street and extending 60 feet south, there is a warehouse 338 feet long. This building, which is of brick construction, has a capacity of 28,000 square feet of lumber in five rooms. South of this warehouse there is an additional storage space available for 60,000 feet of lumber. This area extends to Kent street.

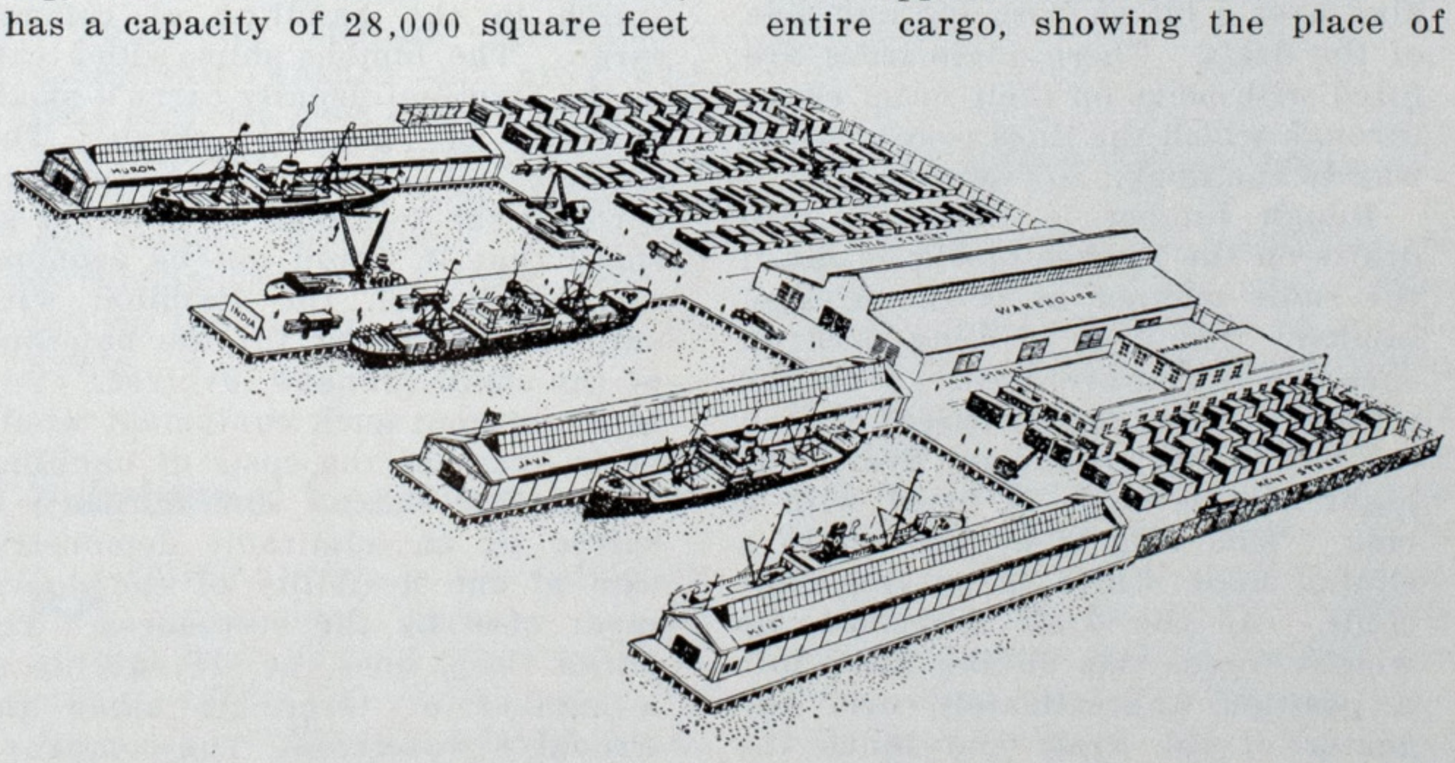
In the storage yards the lumber is crane-piled. The height to which it is piled depends, of course, upon the amount of lumber in the yard at any one time. Lumber has been piled as high as 18 to 20 feet.

### Handling Lumber

In the handling of lumber from the ship's holds to the deck of the pier, 13-men gangs are used. Eight men of the gang are employed in the holds, making up the drafts, two are winchmen on the deck of the ship, one is a signalman, also on deck, and the other two are on the dock to receive the drafts.

The lumber is stowed in the ship's holds and 'tween decks. As each lot of lumber is stowed in the ship it is marked across the top with various colored paints or chalk. Double lines of a particular color of paint are drawn across the top of each lot of lumber, and where the lot does not extend clear across a section the colored lines are continued down the side of the lot. The ends are similarly marked, sometimes with the same color and at other times with a different color.

The stowage plans for the lumber ships are made up of several sheets, each corresponding to a hatch. All the cargo that can be worked through each particular hatchway is shown on the sheet which represents that hatch. The following information is recorded on each sheet: (1) Stowage number; (2) separation and end marks; (3) sizes of lumber; (4) place of stowage; (5) quantity in board measurement; and, (6) consignee and point of discharge. The sheets, one for each hatch, are then fastened together in such a manner that when all are opened out they present a complete view of the vessel. On the reverse side of the sheet for No. 1 hatch, which would be on the outside when the plan is folded, there appears a recapitulation of the entire cargo, showing the place of




*Layout of the Brooklyn Intercoastal Terminals on the East River, after proposed improvements have been made*

discharge and the quantity destined for each port in each of the hatchways.

The hold gang makes up the drafts of lumber. Two lumber blocks are laid at distances appropriate to the length of lumber being handled. The lumber block is made up of a cross-piece approximately 4 inches wide, mounted on two short blocks of the same type of lumber, so arranged as to leave the cross-pieces free on the ends for a distance of about 6 inches. A line is drawn around the free ends of each block and over the draft. Here it is hooked on to a movable ring which, when the draft is lifted, forces the ropes tightly around the draft and prevents the lumber from slipping.

The size of the draft depends to a great extent upon the type of lumber being handled and also upon the capacity of the ship's gear being employed in the discharging, but the most common draft measurement is approximately 4 feet square. The rate of discharge varies greatly, depending upon many factors such as type of lumber, character of stowage, efficiency of the gang, adequacy of the ship's gear, available landing space, dexterity of the Ross carrier drivers, the weather, and a host of other factors all of which contribute to speed up or hinder the operation. The average rate of discharge varies from approximately 14,000 to 26,000 feet board measurement per hatch hour.

### Types of Slings Used

When handling dressed lumber a different type of sling is used. Two steel rails are laid down in the holds at a distance appropriate to the length of the lumber being handled. At each end of these rails there is a ring. A line is drawn from the rings, up along the side of the draft and over to the center where the hook is located. At the top corner of the draft, where the pressure of the lines on each side might possibly injure the lumber, an angle iron extends between the lumber and the line, running over a bit on both top and side of the draft. These angle irons are fitted with rings on their outer edges through which the lines pass on their way to the hook.

Rough lumber is made up into drafts on the lumber blocks in much the same manner as is the dressed lumber. The type of sling used on such drafts, however, varies from the others. A steel rope is passed around the blocks and around the draft. The bight of this cable is fitted with a ring. This ring is hooked on to a sliding hook which is on the same cable. As the draft is raised, its weight forces this sliding hook into a position approximately over the center of the draft and binds the lumber very tightly, so that all possibility of its slipping is eliminated.

On the open pier at India street the lumber cargo is landed on the deck, about 10 feet in from the stringpiece. This is an ideal position for rapid pick up by the Ross carriers, which can reach the drafts with a minimum loss of time. The number of Ross carriers used per gang varies with the length of the haul involved. One or two per gang is generally sufficient.

On the covered piers it is a bit more difficult to land the draft very far inside the shed. On these piers the draft is lowered over the side of the ship, almost but not quite to the deck of the pier. One end of a line is made fast to the hook from which the draft is suspended and the other end to a Ross carrier. By proper co-ordination between the driver of the lumber-carrying machine and the winchmen, the draft is pulled into the shed for a distance of about 7 or 8 feet, in which position the carrier can readily pick up the draft.

The stevedoring, which is ably performed by The Jarka Corp., New York, calls for the application of scientific principles of modern terminal management. The type of ships calling at the terminal present many interesting and varied problems, all of which are satisfactorily and economically solved by that organization. Quite a few of the vessels are equipped with cargo booms of ordinary length, of the type used in handling general cargo. Such ships, naturally, are much more difficult to work when handling lumber than are others equipped with long booms, which are more favorable for the handling of such cargo because it is possible to land drafts well inside the stringpiece on the pier. Some of the ships that have short booms, however, have them mounted on tables which rise to a height of 10 to 12 feet above the decks. By such an arrangement, the length of the booms is increased correspondingly.

### Handling General Cargoes

The efficiency of the terminal operators and stevedores is also illustrated in the handling of general cargo. The lumber ships which call at the terminal usually carry a small amount of general cargo. The amount of such cargo moving through the terminal, however, is so small that it would not be economical to furnish the terminal with suitable equipment for the handling of the small tonnage involved. Yet, to be without such equipment would be to increase the costs of handling the general cargo. This difficulty is solved by an admirable demonstration of the flexibility of the equipment used by the stevedores. The Jarka Corp. does the stevedoring at a number of terminals along the Brooklyn waterfront. The company's equipment is utilized at all of these operations. Movements are made from pier to pier by motor truck as the equipment is needed. Under this system, materials handling equipment may be concentrated at one pier, or spread over several of its operations, depending upon the tonnage handled at any one point. This avoids an expensive tie-up of costly equipment by making such units available for use at all times.

All-steel trailers of a special type are available for use whenever necessary at the Brooklyn Intercoastal terminal. The platforms of these trailers are 6 and 9 feet in length, and provision is made for the insertion of steel tubular racks. The racks are used when loading and discharging loaded trailers from the ships. The top of the platforms on these trailers is about 8 feet from the deck of the piers and they are easily loaded and discharged.

### Pie-plate Slings are Used

When loading or discharging small-package freight, the cargo is placed on trailers which are wheeled directly onto pie-plate slings and blocked in place. The pie-plate sling is a round wooden platform 6 feet in diameter which is placed in the center of a net sling. The width of the pie-plate prevents the net sling from coming in contact with the cargo and causing damage. Once the trailer is blocked in place, the pie-plate is lifted over the side of the ship and down into the holds. In the unloading operation, empty trailers are lowered into the ship, loaded, and then hauled out and rolled into position on the pier.

All operations at the Brooklyn Intercoastal terminal show an admirable application of the scientific principles of modern materials handling. Adapting itself to some of the existing conditions, altering others, developing still more and taking advantage of the knowledge of experts in the field of cargo handling, this terminal bids fair to become one of the most efficient along the Atlantic coast.

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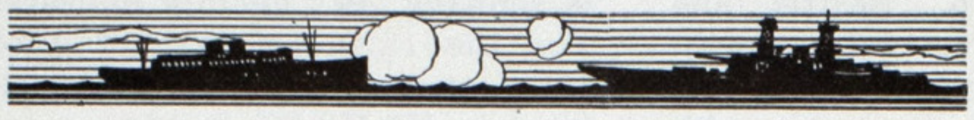
## Recondition U. S. Liners

Bids ranging from $350,000 for both ships and 65 days' time for each ship to $450,000 and 125 days for both ships were received by Gibbs & Cox, naval architects, New York, for alteration and improvements in passenger accommodations, particularly in the third class, on the United States liners PRESIDENT HARDING and PRESIDENT ROOSEVELT.

The low bid was received from Sun Shipbuilding & Dry Dock Co., Chester, Pa., and the high bid from the Maryland Dry Dock Co., Baltimore, Md. Additional bids, between the limits mentioned, were received from six other shipbuilding and ship repair yards.

# Useful Hints on Cargo Handling



THE following incident was classified as a "near accident." It occurred while a winch operator was assisting in the discharge of cargo. While at his work, the block snapped. Injury was prevented by precautionary measures. A preventor—a wire strap—had been placed around the mast to the block at the heel of the derrick. Had the wire not been so placed before the work started, it was said, the winch driver might have been fatally injured because there was no possible way for him to get away when the block snapped.

An iron bar used for opening scow doors of a side-opening dump scow had become bent. An employe was trying to straighten the bar by using it as a lever. He slipped, causing the bar to slip also and to strike him on the hand. An investigation of the accident resulted in a decision that he had employed the wrong method. The bar, it was pointed out, should have been straightened by being placed so that it could not slip during the operation, or at site less precarious than the slippery deck of the scow, or ought to have been straightened by striking it with a sledge.

Both of the above incidents were reported to the marine section of the National Safety council during the past year.

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Empty electric light sockets which are exposed to the weather on piers can be most effectively protected by the use of ordinary cork bottle stoppers to plug up the socket. This prevents "weathering" on the inside of the socket.

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## Cargo Handling Analyzed

AT New Orleans, 19,375 cases of pineapples, having a total weight of 348 tons, were discharged using 248 man hours; or about 1.4 tons per man hour.

Analysis of the cost of cargo handling at a terminal for coastwise operation shows the percentage division of cost per ton as follows: Stevedoring, 52; checking, 10; watching and cleaning, 9; supervision, 10; tiering, 6; and miscellaneous, 13. The tons per man hour on this operation averaged about 1.8 tons loading and discharging combined. Loading, the tons per man hours was 2.0 and discharging, 1.6.

Dividing it into its principal items, the cost per ton of handling cargo on a New York terminal works out about as follows: Stevedoring labor, 58 cents; gear, 9 cents; rent of terminal, 50 cents; checking dock labor, watching and coopering, 20 cents; insurance, 6 cents, and supervision 6 cents; making a total cost per ton of $1.49.

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*THIS page is being devoted to short items on all matters having to do with the more efficient turnaround of ships. These items are intended to be of a helpful nature.*

*We will welcome for this page brief descriptions, illustrated if possible, of any better or safer way of performing any function in cargo handling. Also, any questions submitted will be answered by the editor.*

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## Arrivals and Departures

A BLACKBOARD, on which is posted the time of arrival and departure of ships, is used in several ports and on several terminals. The erection of such boards at centrally located points in and about the harbor and terminals will insure that all persons concerned with the ships are duly notified of the details of arrivals and departures. A great many ports and terminals could make effective use of such boards.

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Tubs for potash should be thoroughly washed out after each time they are used and all remaining salt removed. The tubs should then be turned over so that water will not collect in them. Under no circumstances should these tubs be left on the pier as is while finishing a ship.

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## Substantial Construction

MUCH criticism is levelled at the government because of its policies regarding the construction of public edifices. Ordinary hooks for doors are fashioned out of brass, extra large sizes of steel pipes are used for railings, etc. When one looks at some of the piers constructed by private interests, however, and sees the light construction employed for fire bucket racks, railings, small cleats, etc., one can readily realize that the government is really economizing by building with durability as a primary consideration, and not spending money unwisely. Durable equipment pays for itself by reducing maintenance charges and replacement costs.

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## Loads Railway Equipment

THE Norwegian motorship BELPAMELA, a special ship for the carriage of railroad equipment, recently loaded the largest export shipment of railway equipment since 1929. There were 10 Baldwin narrow-gage locomotives and 15 Bethlehem first class passenger coaches, consigned to the Chilean State railways.

The locomotives were erected completely in the Baldwin shops, loaded upon flat cars and handled to the dock of the locomotive company. The passenger coaches came from the Harlan plant of the Bethlehem Steel Export Co. at Wilmington, Del. on temporary standard gage trucks because the cars have regular trucks of 5 feet, 6 inches gage, for use on the broad gage part of the Chilean State railways.

The locomotives and tenders were stowed in the hold. The cars were stowed on deck athwartship, extending over the side of the ship approximately 12 feet on each side.

Loading was done both with the ships special heavy lift gear and shore crane.

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## On Loading Scrap Iron

AT some ports occasional cargoes of scrap iron are loaded quickly and economically by the use of old iron tanks. Tanks of about five or six feet in diameter are cut lengthwise down the center. The ends are removed with an acetylene torch. Shackles and bridles are attached to the two front corners and to the center of the rear of the tank. Scrap is thrown into the tanks direct from cars, hoisted over the ship's side and dumped into the holds simply by releasing the two front hooks.

## Barge Canal Tolls Opposed by Maritime Association

The board of directors of the Maritime Association of the Port of New York at its regular meeting, held Feb. 14, confirmed the resolution proposed by the canal committee in opposition to the suggested amendment of the New York state constitution to permit imposition of tolls on canals of New York State by legislative action.

The Maritime association pointed out that the carriers on the New York State Barge canal are in keen competition on import and export traffic to the interior of the United States with carriers of foreign registry operating on the St. Lawrence waterway from Montreal to points on the Great Lakes; that there are no tolls assessed, nor is there any provision for tolls under the proposed St. Lawrence treaty, nor would it be possible to impose tolls on this waterway by the independent action of the United States or any state. Thus should tolls be imposed upon American operators via New York State Barge canal, they would be still further handicapped in addition to the difficulties they already operate under in competition with the St. Lawrence waterway because of the shallow draft, narrow and twisted channels and low clearances of the present Barge canal.

## British Naval Architects

The seventy-sixth annual meeting of the Institution of Naval Architects will be held April 10 to April 12, 1935, inclusive, in the lecture hall of the Royal Society of Arts, John street, Adelphi, W. C. 2, London, England.

A gold medal is to be awarded by the council to any person not a member or associate member of the council who shall at these meetings read a paper which, in the judgment of the council, is deemed to be of exceptional merit. The council will also offer a premium of books or instruments to the reader of any paper, not being a member or associate member of council, which paper, in the judgment of the council, merits this distinction.

## Northwest Shipbuilding

Additional new contracts for wooden hull, diesel propelled, fishing vessels and wooden scows have been placed with Puget Sound shipyards, where the seasonal activity is somewhat better than normal. Thirteen vessels are involved in awards recently announced.

The Maritime Boat & Engine Works, Seattle, has commenced work on six scows and four seiners. Two of the latter are for the Ward Cove Packing Co., Alaska. They are 54 feet in length and are to be propelled by 70 horsepower Hall-Scott diesel engines. The six scows are for the same owner. At the same yard two 55-foot wooden seiners are under construction for the Nakat Packing Corp., Seattle and Alaska. They are to be equipped with 65-horsepower Superior diesel engines.

The Nakat Packing Corp. has also awarded a contract to the Olson & Sunde Marine Works, Seattle, for a powerful 78-foot cannery tender. This vessel is to be equipped with a 225 horsepower diesel engine, the make of which had not been decided upon as this is written. The new craft for the Nakat Corp. were designed by H. C. Hanson, Seattle naval architect, who will also supervise the work.

For two individual Alaska fishermen the Sagstad Boat Works, Seattle, will build two 45-foot wooden hull sailors. Power will likely be lightweight diesel engines.

## Passengers at Boston

Passenger arrivals for the year 1934 as compared with 1933 at the port of Boston showed a substantial increase, while vessel arrivals for the same period showed a slight decrease. During the year ending Dec. 31, 1934, there arrived 7688 passengers from European countries, 682 from Newfoundland, 36,889 from Canada and 4095 from the British West Indies and Bermuda, or a total of 49,354, as against 7191 from Europe, 455 from Newfoundland, 34,261 from Canada and 2941 from West Indies and Bermuda, a total of 44,848 in 1933, showing an increase in 1934 of 4506.

The number of vessels arriving at the port of Boston during 1934 was 1475 as compared with 1514 vessels in 1933.

## Steel Hatch Covers

Seven new Japanese ships have, during the last half year, been fitted with steel hatch covers of the design put out by Macgregor & King Ltd., London. Included in these vessels are the six motorships for the Orient to New York service of the Nippon Yusen Kaisha. Each vessel has six "Macanking" hatch covers of the athwartship type on weather decks and a modified arrangement of the same type of hatch cover for 'tween decks.

This type of hatch cover has also been fitted on the twin screw turbine vessel TAROONA for the Tasmanian service and on the motorship JANSSENS in Holland, where similar covers are being fitted to the new vessel for the United Netherlands Co.

The U. S. S. DALE, the latest destroyer for the navy, was launched at the New York navy yard, Brooklyn, N. Y., Jan. 23.

## Baltimore Port Business Shows Improvement

Business at the port of Baltimore is showing very definite improvement. For the calendar year of 1934 the value of exports was $41,910,462 and imports $53,472,099 making a total of $95,382,561. This compares very favorably with the calendar year 1933 when the value of exports was $26,005,091, imports $46,460,944 and total $72,466,035. The customs receipts for the calendar year 1934 were $9,860,863.25 as compared with $7,758,059.85 for the calendar year 1933.

The entrances and clearances at the port of Baltimore during 1934 were: 2626 vessels of 6,643,335 net tons entered and 2852 vessels of 7,060,340 net tons cleared, making a total of 5478 vessels of 13,703,675 net tons. This compares favorably with 1933 when the entrances and clearances and total were respectively, 2349 vessels of 5,849,565 net tons, 2602 vessels of 6,362,639 net tons, and 4951 vessels of 12,212,204 net tons. The increase for 1934 was therefore 277 vessels of 793,770 net tons entered; 250 vessels of 697,701 net tons cleared; and a total of 527 vessels of 1,491,471 net tons. In this increase a substantial part is represented by vessels in foreign trade.

## Appointed Vice President

A. N. Floyd, who since 1920 has been vice president and general manager of the New Orleans & South American Steamship Co., a Grace Steamship Co. subsidiary, has been appointed vice president of the Grace line with headquarters at Cristobal, C. Z.

He will be in charge of the operations of the new Grace line feeder service consisting of the motorships SANTA MONICA and SANTA CATALINA, operating between Cristobal, C. Z., and Callao, Peru, and the steamships CORINTO and SEKSTANT, operating between Cristobal, C. Z., and Champerico, Guatemala.

## D & C Buys Freight Vessel

The steamer WM. F. FITCH, 346 feet long, 48 feet beam, 28 feet deep, and of 3629 gross tons, has been purchased by the Detroit & Cleveland Navigation Co., Detroit. This vessel formerly belonged to the fleet of the Jenkins Steamship Co.

In the coming season the WM. F. FITCH will be used by the new owner in carrying automobiles, replacing the chartered vessel UTICA in this service. Work is now being carried out at Detroit in connection with the intsallation of elevators and enlarging the sideports for handling automobiles.

# Up and Down the Great Lakes

## Closing, Opening Dates—Lake Levels— Bulk Freighters Sold — Officers Elected

ALWAYS in the past, anxiety to begin operations to the ports of the St. Lawrence and the Great Lakes as early as possible has tended to force the hand of nature. There has never been any fixed date set for the opening and closing of navigation.

Now a special committee of the chambers of commerce of Quebec and Levis has recommended that Nov. 25 be established as the closing date of navigation at Montreal and that the official opening date be set at April 25. Furthermore, that, after this official closing date and before the opening date, no vessels are to receive help or to be escorted by ice-breakers. The reason for this proposed action is to save a very considerable sum of money now expended in order to lengthen the season of navigation a few days at each end, an expense which is not warranted by the benefits accruing.

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Lake Superior iron ore shipped during the month of January from Lake Erie docks amounted to 133,768 tons, an increase of 51,904 tons as compared with shipments of 81,864 tons during January, 1934.

This leaves 5,022,889 tons of lake ore on Lake Erie docks as of Feb. 1, this year, against 5,246,278 tons on these docks at a corresponding date last year.

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## Election of Officers

At its annual meeting at Detroit, Jan. 29, the Detroit & Cleveland Navigation Co., re-elected James T. MacMillan president. Other officers are James Turner, vice president; James R. Coulter, vice president and treasurer; and William K. Muir, secretary.

Directors of the company are James T. MacMillan, James Turner, James R. Coulter, George T. Hendrie, William K. Muir, Emory W. Clark, David S. Carter and Charles L. Perkins.

Charles L. Perkins was appointed general manager and William K. Muir general superintendent and assistant treasurer. Edward T. Fitzgerald was appointed assistant to the president. Other appointments include George B. Wright, freight traffic manager; E. H. McCracken, passenger traffic manager; H. M. O'Laughlin, assistant treasurer and assistant secretary; and B. C. Wilder, general auditor.

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Neil C. Hurley, Robert V. Hoopes and Aaron Colnon were elected directors to fill vacancies at the annual stockholders meeting of the Great Lakes Dredge & Dock Co. All other directors were re-elected.

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## January Lake Levels

The United States Lake survey reports the following monthly mean stages of the Great Lakes for the month of January, 1935, determined from daily readings of staff gages.

| Lakes | Feet above mean sea level |
|---|---|
| Superior | 602.55 |
| Michigan-Huron | 577.62 |
| St. Clair | 572.74 |
| Erie | 569.55 |
| Ontario | 243.02 |

Lake Superior was 0.30 foot lower than in December and it was 0.14 foot above January stage of a year ago.

Lakes Michigan-Huron were 0.11 foot lower than in December and they were 0.14 foot above the January stage of a year ago, 1.00 feet below the average stage of January of the last ten years.

Lake Erie was 0.12 foot higher than in December and it was 0.40 foot below the January stage a year ago, 1.64 feet below the average stage of January of the last ten years.

Lake Ontario was 0.16 foot higher than in December (since 1900 the January level has averaged the same as December); and was 0.57 foot below the January stage of a year ago, 1.93 feet below the average stage of January of the last ten years.

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## Lake Bulk Freighters Sold, to Continue in Service

The Reiss Steamship Co., subsidiary of the C. Reiss Coal Co., with main offices at Sheboygan, Wis., late in January purchased the 618-foot, 14,000-ton deadweight bulk freighter, JOHN A. TOPPING, from the Columbia Transportation Co., John T. Kelly, manager, Cleveland.

The TOPPING, one of the largest and finest freighters on the Great Lakes, was built by the Great Lakes Engineering Works at River Rouge, Mich., in 1925, at a cost of something over a million dollars. In joining the Reiss fleet she will be renamed the WILLIAM A. REISS, taking the place of the former vessel of that name which was damaged beyond repair when she ran aground near Port Washington, Wis., last fall.

Shortly after having sold the TOPPING, the Columbia Transportation Co. on Feb. 12 increased its fleet of bulk freighters from nine to 17 by the purchase of eight ships from the Valley Camp Steamship Co. Announcement of the purchase of this large fleet, one of the most important transactions on the Great Lakes in several years, was made by Crispin Oglebay, president of the Columbia Transportation Co. which is a subsidiary of Oglebay, Norton & Co., Cleveland, one of the largest mine operators and shippers of iron ore.

The sale places under one control a fleet of much greater trip capacity for the transportation of coal to upper lake ports and ore downbound. The Valley Camp Co. has coal docks at several ports including Milwaukee and Superior.

The vessels of the Valley Camp Co. included in the sale are the E. G. MATHIOTT, THOMAS BRITT, HARRY T. EWIG, O. S. MCFARLAND, G. G. POST, MICHAEL J. BARTELME, S. R. WAY and WILLIAM B. PILKEY. The four self-unloading vessels owned by the Valley Camp Co. were not included in the sale but will be operated by the Columbia Transportation Co. They are the WILLIAM NELSON, ROBERT J. PAISLEY, JOHN MCCARTNEY KENNEDY and D. E. CALLENDER.

Before the addition of the eight vessels bought from the Valley Camp Steamship Co., the fleet of the Columbia Transportation Co. consisted of the JOSEPH H. FRANZ, HARVEY D. GOULDER, HOWARD M. HANNA JR., C. RUSSELL HUBBARD, WILLIAM LIVINGSTONE, LEONARD B. MILLER, DAVID Z. NORTON, W. C. RICHARDSON and WILLIAM F. STIFEL.

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Stephen C. Tooker, Chicago, president of the Propeller Club, Port of Chicago, died on Feb. 5, following an operation for appendicitis. He was about 39 years of age and was vice president of the Tooker Storage & Forwarding Co., Chicago, New York, and San Francisco. He leaves a widow and two daughters.

## Plan Two New Vessels for Mississippi Shipping Co.

The Mississippi Shipping Co., New Orleans, which operates a mail contract service between that port and ports on the East coast of South America, is required under the terms of its contract to build two new class 5 vessels. The minimum requirements under class 5 call for a speed of not less than 13 knots and a gross tonnage of not less than 8000.

It is reported that V. M. Friede, naval architect, New Orleans, has under preparation plans and specifications for two new 9000-ton combination cargo and passenger vessels to be approximately 400 feet in length and to meet the requirements of the Mississippi Shipping Co.'s service from New Orleans to South America. The total estimated cost of the proposed two new ships is about $3,900,000.

The service of the company is now being maintained by four reconditioned Hog Island type freighters, having a speed of 13 knots and accommodations for about 38 passengers each. These vessels are the DELNORTE and DELSUD placed in service in the summer of 1931. These two first vessels when they came out had accommodations for 28 passengers each. The other two, the DELMUNDO and DELVALLE, were converted and reconditioned by the Newport News Shipbuilding & Dry Dock Co., Newport News, Va. In accordance with plans and specifications developed by Mr. Friede, each had accommodations for 38 passengers and entered service in August and September, 1932.

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## United States Engineers

The United States engineer office, Milwaukee, Wis., Lieut. Col. H. M. Trippe, district engineer, was to be ready on Feb. 21 to issue specifications for the construction and delivery afloat at Grand Haven Harbor, Mich., two 225-cubic yard, steel dump scows, complete with machinery and fittings.

## Big Traffic Increase Noted at Port of Los Angeles

Exports at the port of Los Angeles have shown a marked increase during January, 1935, being in excess of $9,900,000 in value, as compared with $5,785,043 during January, 1934, an increase of over 70 per cent, the largest since September, 1930.

Imports likewise showed almost 100 per cent gain, being $5,088,000 for January, 1935 as against $2,542,470 for January, 1934.

There were also increases in tonnage, exports amounting to 412,000 tons in January, 1935, compared with 343,000 tons in January, 1934. Imports in January, 1935 amounted to 70,000 tons compared with 38,000 tons for the same period a year ago.

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Specifications were issued on Feb. 19 by the United States engineer office, Milwaukee, Wis., for dredging, by pipe line dredge, approximately 880,000 cubic yards of materials at Green Bay harbor, Wis.

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# Sea-going Bank Installed on Pacific Liner

SOMETHING new in both shipping and banking as well as an added service to passengers is the sea-going bank installed by the American Trust Co., San Francisco, on the Matson-Oceanic transpacific liner MARIPOSA early in February. Offering complete foreign exchange facilities, the sea-going banking office has as its purpose increased shipboard service for the convenience of travelers.

The accompanying illustration shows the liner MARIPOSA leaving San Francisco, in regular service, for New Zealand and Australia via Hawaii, Samoa and Fiji. She is a sistership of the eight-million-dollar luxury liner MONTEREY in the same service. These vessels are among the latest, finest and largest vessels of the American merchant marine, and were made possible by the merchant marine act of 1928.

Planned under the direction of P. A. Kinnoch, vice president of the American Trust Co. and manager of that organization's foreign department, the traveling bank agency will prove its particular value in exchanging United States dollar currency (the standard used aboard ship) for the foreign currency and coins in use in ports beyond the American frontier at Honolulu. No deposit accounts will be accepted but other usual services required by travelers—cashing of drafts against letters of credit and cashing and sale of travelers' checks—will be available.

To the shipping fraternity this new feature is a particularly interesting one. It has created a new term in the glossary of the merchant marine, for on a parity with the "navigating officer," "deck officer" and others, the nautical cashier becomes the "banking officer." In this particular instance this "officer" is Walter J. Grierson.

For the Matson-Oceanic line this new service is the latest of a long line of "firsts" pioneered by this organization in its long and interesting history on the Pacific. Among these "firsts" are, the use of oil in ship propulsion, showing of motion pictures for passenger entertainment, the adoption of submarine and radio direction finding, ultra safety equipment, and the unique "exploration cruises."

*Matson-Oceanic Line inaugurates a full-fledged bank on the transpacific liner Mariposa. A similar bank will be installed on the Monterey, early in March.*

# Personal Sketches of Marine Men

## David Arnott, Chief Surveyor, American Bureau of Shipping

By Ben K. Price

THROUGH unique experience in a highly specialized field he has contributed much toward improvement in ship design and construction.

HE SERVED with distinction as technical adviser to the United States delegation at the Safety of Life at Sea Convention, 1929.

A MEMBER of the United States delegation to the Load Line Convention, he won respect for his thoroughness and sound judgment.

IN MARITIME circles throughout the world the name of David Arnott is well known. Affiliated with shipping for 40 years, holder of responsible positions in England and Canada before coming to the United States in 1918 and chief surveyor of the American Bureau of Shipping since 1925, Mr. Arnott holds a high place in the esteem of technical marine men both here and abroad.

His experience has been unique, for since he was 23 years of age he has been engaged in the highly specialized work of surveying and classifying ships, both here and on the other side. However, his experience has not been limited to the sheer routine of his work, for he has contributed various important technical papers and has been prominent at national and international conferences pertaining to shipping.

He was technical adviser to the United States delegation to the convention on the Safety of Life at Sea at London in 1929, and also was a member of the United States delegation to the Load Line convention at London a year or so later—to cite two notable instances.

Mr. Arnott was born in Glasgow, Scotland, in 1878 and was educated at Gartsherrie academy, Coatbridge, Scotland, and at the Royal Technical college, Glasgow. He served an apprenticeship as a shipbuilder from 1894 to 1900 with the Fairfield Shipbuilding & Engineering Co. Ltd., Glasgow, and gained further experience during a year's service as draftsman in the hull drawing office of William Beardmore & Co., and also on the Clyde

Then, in 1901, came his first appointment as ship surveyor, with the Glasgow head offices of the British Corporation for the Survey and Registry of Shipping. now the British Corporation Register of Shipping and Aircraft. During his services in the Glasgow offices he was engaged in all branches of ship survey work, including valuable experience with the technical staff on load line administration and investigations into the structural strength of ships.

Early in 1917, he was made principal surveyor for Canada for the British Corporation, with headquarters in Toronto. There he had an opportunity of becoming familiar with the special problems of Great Lakes shipping, for many of the small "lakers" were being fitted out for overseas service at that time.

Then, the following year, he came to the United States. Here the unprecedented Emergency Fleet shipbuilding program was fast gtting under swing, and was throwing a tremendous burden on the newly reorganized American Bureau of Shipping, which had been entrusted with the supervision during construction of more than 3,000,000 tons of ships with a view to classification. It was in these strenuous times that Mr. Arnott resigned his position as a British Corporation surveyor and accepted the invitation of the late Stevenson Taylor to go to New York as assistant chief surveyor of the American Bureau, a position he held from August, 1918, until January, 1925, when he was appointed to his present duties.

Incidentally, at the time of the reorganization of the bureau, which was in 1916 and under the direction of Mr. Taylor, the Great Lakes Register was absorbed and an agreement was formed with the British Corporation for technical co-operation and mutual services, which has since been extended to include the Registro Italina and the Imperial Japanese Corp. Since its reorganization the bureau has grown steadily in importance and prestige until now it has 65 surveyors engaged exclusively in its service at various ports in the United States, including 10 in the Great Lakes district. In this development Mr. Arnott has contributed an important part.

Mr. Arnott is a council member of the American Society of Naval Architects and Marine Engineers and is affiliated with the British Institution of Naval Architects. He represents the American Bureau on various important standing committees of the American Society for Testing Materials, American Welding society, the Marine Section of the National Fire Protection association and others.

His most recent important paper was one pertaining to arc welded ship construction, presented at the annual meeting of the Society of Naval Architects and Marine Engineers in New York last November.

# SHIPBUILDING,

## World's Output Almost Doubled

CONSTRUCTION of merchant vessels throughout the world during 1934 was almost double that of 1933, according to a statement recently issued by Lloyd's Register of Shipping, covering launchings of all vessels of 100 gross tons and upward, for all countries except Russia, for which returns have not been available for some time.

Last year's total of 967,419 gross tons, showed a gain of 478,000 tons over 1933, and of 241,000 tons over 1932; but is 650,000 tons less than the 1931 figure, and 2,365,000 below the total for the last pre-war year, 1913.

Much the largest gain reported was for Great Britain and Ireland, which launched about three and a half times as much tonnage in 1934 as in 1933, the increase amounting to 326,000 gross tons, or more than two thirds of the gain for the entire world. Japan more than doubled its figure for 1933.

Launchings for the United States aggregated about two and a half times this country's production for 1933, but the increase represented only about 14,000 tons. All the American construction was carried out on the Atlantic coast.

### Tonnage Launched Compared

How launchings in Great Britain and Ireland, the United States, and the other maritime countries, taken as a group, have compared during the last two years is shown in the following table, the figures representing gross tons:

| | 1934 | 1933 |
|---|---|---|
| Great Britain and Ireland.. | 459,877 | 133,115 |
| United States | 24,625 | 10,771 |
| Other countries | 482,917 | 345,130 |
| **World total** | **967,419** | **489,016** |

The total amounts of merchant shipping launched throughout the world during the last pre-war year, 1913, and for all years since the end of the war, are given in the following figures of gross tonnage.

| | Yearly Launchings | Gain or Loss |
|---|---|---|
| 1913 | 3,332,000 | ..... |
| 1919 | 7,144,000 | +3,812,000 |
| 1920 | 5,861,000 | —1,283,000 |
| 1921 | 4,356,000 | —1,505,000 |
| 1922 | 2,467,000 | —1,889,000 |
| 1923 | 1,643,000 | — 824,000 |
| 1924 | 2,247,000 | + 604,000 |
| 1925 | 2,193,000 | — 54,000 |
| 1926 | 1,674,000 | — 519,000 |
| 1927 | 2,285,000 | + 611,000 |
| 1928 | 2,699,000 | + 414,000 |
| 1929 | 2,793,000 | + 94,000 |
| 1930 | 2,889,000 | + 96,000 |
| 1931 | 1,617,000 | —1,272,000 |
| 1932 | 726,000 | — 891,000 |
| 1933 | 489,000 | — 237,000 |
| 1934 | 967,000 | + 478,000 |

### United States Output Small

In 1932, the shipyards of the United States launched only about 45,000 gross tons of merchant vessels less than were sent down the ways in Great Britain and Ireland. In 1933, however, the gap was 123,000 tons, and last year the lead of Great Britain and Ireland expanded to 435,000 tons. Before the war Great Britain and Ireland were launching about 1,650,000 tons more than the United States, but in 1919 American shipyards led by about 2,450,000 tons. Great Britain and Ireland are now building about twenty tons for every one produced in the United States. The comparison in the output of these countries during recent years is shown in the following gross tonnage table:

| | United States | Great Britain and Ireland |
|---|---|---|
| 1913 | 276,000 | 1,932,000 |
| 1919 | 4,075,000 | 1,620,000 |
| 1920 | 2,476,000 | 2,055,000 |
| 1921 | 1,006,000 | 1,538,000 |
| 1922 | 119,000 | 1,031,000 |
| 1923 | 172,000 | 645,000 |
| 1924 | 139,000 | 1,439,000 |
| 1925 | 128,000 | 1,084,000 |
| 1926 | 150,000 | 639,000 |
| 1927 | 179,000 | 1,225,000 |
| 1928 | 91,000 | 1,445,000 |
| 1929 | 126,000 | 1,522,000 |
| 1930 | 246,000 | 1,478,000 |
| 1931 | 205,000 | 502,000 |
| 1932 | 143,000 | 187,000 |
| 1933 | 10,000 | 133,000 |
| 1934 | 24,000 | 459,000 |

Nearly 75 per cent of all the world's merchant shipping launched last year was built to Lloyd's supervision.

Vessels launched during 1934 included 46,757 gross tons constructed for countries other than those in which the vessels were built, as compared with only 12,077 tons in 1933.

### Tanker Launchings Increase

Launchings of steam and motor tankers of 1000 gross tons and upwards, each, last year were more than double the total for 1933. More than a third of the total tanker launchings last year were in Great Britain and Ireland. The comparisons between 1933 and 1934 in this type of production are given in gross tons in the following table:

| | 1934 | 1933 |
|---|---|---|
| Great Britain and Ireland.... | 69,066 | ..... |
| Sweden | 32,150 | 32,420 |
| Germany | 24,700 | 12,197 |
| Japan | 20,102 | ..... |
| Holland | 18,725 | ..... |
| Denmark | 17,897 | 8,500 |
| United States | 4,937 | ..... |
| Others | 10,760 | 29,558 |
| **World total** | **198,337** | **82,675** |

Of the total tanker construction, all but 16,744 gross tons represented motor tankers.

### Over Half In Motorships

During 1934 there was a continuation of the trend shown markedly in 1933, when production of motorships was greater than that of all other types of vessels combined. In 1932 launchings of motorized ships aggregated 190,000 gross tons less than that of other types, taken together. In 1934, however, motor vessels exceeded all other types by about 160,000 tons, and represented about 58 per cent of all launchings for the entire world. The comparison last year was not so marked as in 1933, however, when motor vessels represented 69 per cent of world launchings.

Great Britain and Ireland, which stood third in motorship construction in 1933, led all countries last year, with a gain of 141,000 gross tons, replacing Japan in the leadership. Japan's gain over 1933 was 60,000 tons. The comparison in motorship launchings for the last two years is shown in the following tonnage table:

| | 1934 | 1933 |
|---|---|---|
| Great Britain and Ireland.. | 188,994 | 47,825 |
| Japan | 125,688 | 65,273 |
| Denmark | 53,886 | 20,887 |
| Sweden | 48,031 | 60,860 |
| Germany | 45,009 | 40,150 |
| Holland | 43,171 | 35,699 |
| Italy | 25,668 | 16,560 |
| United States | 6,402 | 1,607 |
| Other countries | 26,752 | 48,960 |
| **World total** | **563,601** | **337,821** |

Production of motor vessels exceeded that of all other types for the first time in 1930 and 1931, falling behind in 1932, but regaining the lead the next year. How the launchings of these classes of vessels have compared in recent years is shown in the following tonnage table:

| | Motor Vessels | Other Types |
|---|---|---|
| 1921 | 306,000 | 4,035,000 |
| 1922 | 209,000 | 2,258,000 |
| 1923 | 226,000 | 1,417,000 |
| 1924 | 501,000 | 1,746,000 |
| 1925 | 843,000 | 1,350,000 |
| 1926 | 704,000 | 970,000 |
| 1927 | 863,000 | 1,422,000 |
| 1928 | 1,183,000 | 1,516,000 |
| 1929 | 1,269,000 | 1,524,000 |
| 1930 | 1,582,000 | 1,307,000 |
| 1931 | 920,000 | 697,000 |
| 1932 | 268,000 | 458,000 |
| 1933 | 337,000 | 151,000 |
| 1934 | 563,601 | 403,818 |

The returns show that 42 steamers and motorships of 6000 to 9999 gross tons each were launched last year throughout the world, as compared with 25 in 1933. Of the larger types of ships, 10,000 gross tons

(*Continued on Page* 40)

## Stainless Steel

(*Continued from Page* 17)

the top, as big as oyster shells.

Pits in the fire line piping were also independent of position, proximity to welds, pipe ends, or contact with dissimilar metals. Cast 18-8 valve fittings were punctured as rapidly as the pipe walls only 25 per cent as thick. The worst pitting in this line occurred in dead ends where the water had been almost completely stagnant since installation.

### Sea Water Not a Factor

The conclusion which may be reached from the data is that general attack by chemical reaction with sea water is not a factor in these two services; neither is corrosion by oxidation, by intergranular attack, nor by electrolysis set up by contact with dissimilar metals. Some experimenters blame the trouble on (a) "contact corrosion" under non-metallic substances (either scale or inclusions), or under solid particles brought in by the water, or (b) corrosion by "oxygen concentration cells" existing in porosities and pits or caused by lodgment of organisms or even dead organic matter which has a reducing or deoxidizing nature.

If these conclusions are correct, then a successful 18-8 for these two services must be free of non-metallic inclusions with polished surfaces, and the sea water must be filtered even of microscopic organisms and particles of metal from pumps or valves. Obviously, none of these requirements can now be met, either by steel maker, fabricator or naval engineer, and the decision to abandon 18-8 for gasoline tanks and fire lines until more accurate information is available is not to be criticised. On the other hand, investigation may show that the situation is not nearly as hopeless as it appears to the theorist.

It is noteworthy that the conditions for successful naval service differ from the unsuccessful ones in that the sea water in the first case is freely circulating and well aerated, whereas in the latter is is relatively stagnant. Idle boats in lake waters also pit severely, whereas busy boats have no such troubles with hull plates!

Extensive experimentation by research laboratories of at least two steel producers indicates that attached particles of matter, either organic or inorganic, do not start a pit, even when using harbor water as the corrodent, and particles of muck taken from the damaged pipe and tanks as accelerators. On the other hand, fairly rapid pitting can be induced in 18-8 by special solutions ("pitting solutions," they may be called) such as ferric chloride and sodium hypochlorite, and by certain solids, such as graphite and rubber.

While there is no warrant to draw a close parallel between corrosion in stagnant sea water and in "pitting solutions," some results of experiments in the latter may be informative: The evidence points to irregularities of some sort at the surface as the locus of the pit, where the normal protective coat of oxide is broken and prevented from reforming and attaching itself. Since steels with a low inclusion count pit no less freely than quite dirty ones, it is doubtful that *visible* inclusions are the culprits. Another surface irregularity may be a minor variation in the chemical composition of the iron-chromium-nickel solid solution, and this may be the locus of the trouble.

Some other interesting observations are that a sheet, known to be susceptible to pitting, is almost immune if highly buffed and polished. On the other hand, shearing or sawing out the sample seems to increase the number of pits growing in from the edge, so cold work of this sort has some accelerating action!

Assuming that variation in chemical composition or presence of oxide may locate the surface defect and be the first cause of a pit, some surface treatment can likely be devised which will remove these irregularities before it gets into service. But whether pitting once started can be stopped will be questioned by a believer in corrosion by oxygen concentration cells. This type of corrosion may start immediately wherever there are porosities of small cross-sectional area in proportion to their depth. Under such circumstances, the electrolyte in the bottom of the hole becomes poorer in oxygen than at the entrance, the oxygen-poor area is anodic to the other, and an electrolytic cell is formed. The products of corrosion (iron, chromium, and nickel irons) are carried to the cathode, that is, to the entrance of the pit, where they oxidize; even if they deposit there, they are unable to protect metal at the bottom of the pit from further attack, with the result that corrosion continues until the metal is perforated.

### To Avoid Pitting Corrosion

These considerations lead to the thought that the pitting corrosion may best be avoided by an alloy of considerably different analysis from 18-8—one that is better capable of resisting attack by an oxygen concentration cell.

The bureau of construction and repair, United States navy, has therefore considered the desirability of selecting individual ships in each of which will be installed a complete system of pipe of material which offers definite promise of being free from the pitting type of corrosion in sea water. Preliminary investigations indicate five such materials: (*a*) 18-8 with 3 per cent molybdenum; (*b*) 18-8 with 5 per cent manganese and 1 per cent copper; (*c*) monel metal; (*d*) 70 per cent copper, 30 per cent nickel alloy; (*e*) rubber-lined steel. Results of such trial installations will be awaited with the greatest interest.

While the cause and cure of pitting in stagnant sea water has not yet been discovered, the search is vigorous enough to warrant success. We know enough about it already that any intelligent user of stainless steel can appraise the conditions which exist in his service, and determine whether there is any cause for worry. If chloride solutions are handled in high chromium steels they should be kept neutral, entirely free from ferric chloride, in continuous circulation, and free from organic or inorganic solids. Periodic cleaning of the equipment is also quite desirable.

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## An American Flag Vessel Enters Cruise Field

The Panama Pacific line has arranged for a 21-day "three-way" cruise to Mexico and the West Indies to be made in June by the company's newly acquired 39,935-ton cruise liner, the COLUMBIA. The COLUMBIA is scheduled to sail from New York on June 8, and from Norfolk on June 9. Her ports of call will be Havana, Vera Cruz, Progresso (Yukatan), and Kingston (Jamaica). Homeward bound she will make second calls at Vera Cruz, Havanna and Nassau. The COLUMBIA is due back on June 28 at Norfolk and June 29 at New York.

This cruise is to follow a series of 11-day cruises to be made by the COLUMBIA during the winter and spring months, the first of which began with her sailing from New York on Feb. 16, for Nassau, Miami and Havana. She is also scheduled to make two Easter season cruises.

Capt. John Jensen is in command of the COLUMBIA, with Capt. Joseph Dixon, recently appointed staff captain, second in command. Born in Boston, 38 years ago, Captain Dixon has been in the service of the International Mercantile Marine Co. since 1919, when he joined the MANCHURIA of the American line as junior officer. He served on various ships in this run until they were taken over to inaugurate the new intercoastal service of the Panama Pacific line in 1923, and went into that service with his ship. He was promoted to chief officer of the MANCHURIA in 1925 and also served in the MONGOLIA and FINLAND and in the new CALIFORNIA when she was commissioned. He also served in the MINNEKHADA as chief officer under Captain Jensen.

Captain Dixon's first command was the motoship WARD of the American Pioneer line in 1931. He has been the master of the CITY OF DALHART since August, 1931.

## Steam Turbine

(*Continued from Page* 12)

auxiliary machinery driven from the main engines by suitable gearing and with suitable standbys. The inclusion of the last was made at the suggestion of the late Sir Charles Parsons and reference to it is perhaps not without interest in connection with what follows later in the present paper.

The progress in economy above alluded to has pervaded all classes of ocean going vessels and in particular that class which is the subject of the present paper. The time honored triple or quadruple expansion engine which has held the field almost exclusively for this class of steamer in the past has proved powerless unassisted to maintain its position in this respect, wherefore many proposals have been made and actually carried into construction to attain increased economy by the addition to the reciprocating engine of a low pressure turbine, the power of which is utilized in various ways to augment the total output. Regarding this as a means of increasing the output or reducing the consumption of an existing reciprocating engine, opinions still differ as to whether the increased output or increased economy so obtained justifies the additional cost incurred, and it is easy to understand that the answer to this question will vary with the circumstances in each individual case. Such plants however do not stand in the front rank of economical performance. A complete installation of geared turbines gives a greater economy of steam and fuel, even at ordinary pressures, while at high pressures and temperatures still better results are being realized. It should be recognized, therefore, that the field of such combined installations is in reality limited to the cases where a reciprocating engine is already existing or predetermined by force of other circumstances as a part of the unit.

### A Simplified Propelling Unit

In expectation of a revival of demand for cargo tonnage in the near future a new type of design of turbines and gearing has been specially developed by the firm with which the author is associated, for cargo boats of small power, such as tramp steamers of from 1500 to 2000 shaft horsepower particularly with a view to standardization and simplicity of erection, providing a simple, cheap and reliable plant of the power required with a minimum of component parts and a minimum of assembly, connecting-up or alignment to be done when erecting the installation in the vessel.

The author owes an acknowledgment here to J. Johnson, since it was in collaboration with him that the conception arose of developing a simple unit of this character which would secure the acceptance of tramp shipowners, their superintendents and engineers. The installation designed with these principal objects in view has been called the "Simplex unit." The mechanical reduction gearing consists of a single train of gear wheels in simple succession, a single high speed pinion driving a primary wheel, and a secondary pinion on the same shaft as the primary wheel driving the main wheel on the propeller shaft.

It will be seen that this unit differs in an important respect from the usual turbine drive in which there are two or more pinions, transmitting power to the gearing at the same time, and in which a higher degree of accuracy is necessary, since the inertia of the turbines tends to maintain the speed of the separate pinions in constant relation. The two turbines of the Simplex unit are arranged to drive this single pinion. They consist of a high pressure turbine, with ahead and astern portions, coupled at the after end of the primary pinion, and a low pressure turbine, also with ahead and astern portions, coupled at the forward end of the same pinion. Another feature in the gearing is that the teeth are of the single helical type. This ensures a smooth and positive drive in that there is no fore and aft motion of any of the gears.

### Mounted on Gear Case

The turbines and condenser are mounted on the gear case. The main thrust block is also incorporated in the gear case, so that the attachment of the whole assembly to the ship is made only through the gear case feet, and a single operation of alignment is sufficient for this assembly. Further the alignment of turbines and gearing is not disturbed by any straining of the ship. The end thrust of the teeth of the main wheel is in opposition to the thrust of the propeller, reducing, therefore, the load on the main thrust block. The intermediate shaft and the primary pinion have each its own thrust block to take up the end thrust of the teeth. The pinion and each of the turbines runs in its own bearings, but the pinion shaft is connected to the turbine shaft on each side of it by an expansion coupling instead of rigidly, so as to avoid any accidental bending stresses occurring in the event of any difficulty in maintaining the six bearings accurately in line.

A unit of this description has been built at Turbinia works for a total output of 2000 to 2250 shaft horsepower at a propeller speed of 80 revolutions per minute. After erection it has been subjected to exhaustive tests at full power, the power being absorbed and measured by a Froude dynamometer.

Steam is supplied to the turbines from the works' high pressure boiler at a pressure of 270 pounds per square inch and superheated to 750 degrees Fahr. The exhaust steam is condensed in the condenser, which is part of the unit, at a vacuum of 28½ inches to 29 inches. Tested under these conditions at full power of 2000 shaft horsepower, the steam consumption is about 8¾ pounds. The economy of steam consumption is well maintained even at half power.

A special auxiliary unit to which reference will presently be made has been designed to go with this set of main machinery, and it is intended to erect and test the whole installation in the works as a self contained unit.

### Moderate Steam Pressure

A moderate steam pressure has been adopted in order that any type of boiler can be used in conjunction with this machinery. A general layout has been made for a steamer of 8500 tons deadweight, with boilers of the Howden-Johnson type designed by The Wallsend Slipway & Engineering Co. Ltd., adapted for both coal and oil burning. With preheated air in the heaters it is estimated to obtain a boiler efficiency of 80 per cent and this is in conjunction with the steam consumption above mentioned and a suitable allowance for driving the auxiliaries should give an overall consumption under 1 pound coal per indicated horsepower. The total weight of machinery is 140 tons less than for a similar outfit with reciprocating engines.

A still more compact arrangement of geared turbines on somewhat similar lines will also be of interest. In this design there are two primary pinions driven by high pressure and low pressure turbines respectively and one secondary, the turbines being mounted on the condenser at the forward side of the gear case.

The main propelling unit being simplified in the manner described, it was natural to inquire into the possibility of making a similar simplification for the auxiliary pumps and fans. For this purpose it is desirable to consider how far it is possible to reduce (1) the number of units to be installed, (2) the number of independent operations required for their control, and (3) their steam consumption, or in other words the cost of driving them. It is an attractive proposal, and one which has often been made, to drive all the auxiliary plant by gearing or otherwise from the main engine. Another equally attractive suggestion that has been advanced is the grouping of the various auxiliary units together in order to drive them all from a single engine with a system of countershafts and pulleys ana-

(*Continued on Page* 40)

## Steam Turbine

(*Continued from Page* 38)

logous to the overhead shafting of a machine shop.

On considering the characteristic duties of the various pumps in respect of their output and the head against which they discharge, it will be seen that for the majority of them a rotary drive from the main engine cannot be suitable at all speeds of the ship, since a constant head of discharge is required whatever the speed and direction of the main engine. This is the case with the condensate and feed pumps, the forced lubrication pump and the bilge and sanitary pumps.

At first glance it might appear that the circulating pump and the fans were suitable for driving in this manner, because in these units both the required head of discharge and the required quantity diminish in such a way that a speed reduced in proportion to the speed of the main engine is sufficient to maintain them. But in the case of the circulating pump there is the difficulty when reversing that if this pump were driven from the main engine the vacuum would fall off and stopping power be lost at the moment when the engine came to rest, to avoid which it would be necessary to bring the ballast pump into operation when maneuvering or preparing to maneuver; while in the case of the forced draught fans independent regulation is of considerable value for maintaining the correct proportion of combustion air. From these considerations it appears that a simple system in which the above auxiliaries are driven from the main engines under all conditions is hardly practicable. For all maneuvering conditions these auxiliaries must be independently driven. A system however in which for the sake of economy of overall voyage consumption the auxiliaries were driven from the main engine at full speed ahead, and stand-by auxiliaries provided for other conditions, would both add to the initial cost and be cumbersome in operation.

### Combined Arrangement Used

The solution of this problem employed in conjunction with the Simplex unit is a combined arrangement of certain of the auxiliaries in a group unit, driven by the main engine at full power and by a separate engine when maneuvering. The circulating pump, condensate pump, forced lubrication pump, bilge and sanitary pump are driven in this manner, by a chain drive and friction clutch from the main engine at full power, and through another friction clutch from the auxiliary engine under all other conditions. The feed pump and forced draught fans are not included in the system, but for the sake of independence of control are separate steam driven and motor driven units.

Such an auxiliary unit has been designed and manufactured by Drysdale & Co. to work in conjunction with the main unit described above.

In conclusion the author desires to express his thanks to the Parsons Marine Steam Turbine Co. for facilities in connection with the experiments described, to his colleagues at Turbinia works, to Mr. Johnson, of the Canadian Pacific Steamships Ltd., and to Drysdale & Co.

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## Chicago, Foreign Trade

(*Continued from Page* 25)

at $353,617.

Some coke also is shipped from East Chicago, total exports last year from there and Chicago being 53,757 tons, against 29,457 tons in 1933. A variety of products from Chicago's meat packing plants move to foreign ports via the Great Lakes. Exports of pork in barrels last year were valued at $320,640, compared with $223,024 in 1933. Other meat products shipped last year included beef and hog casings, beef extract, hams, bellies and bacon as well as such by-products as animal hair, green salted hides, cattle hoofs and waste.

Newsprint paper comprises the leading import by water at Chicago, and practically all of this commodity consumed by the Chicago press is delivered by lake vessels from Canadian mills. Two of Chicago's leading daily papers are located on the river-front which facilitates the unloading of paper from vessels to printing plants by eliminating an intermediate handling. Last year imports of newsprint paper amounted to $5,405,503, or nearly 43 per cent of total foreign goods received.

Grains ranked second in importance among imports, being valued last year at $3,849,753. These included feed wheat, rye, oats and screenings. Next in order came food products at $1,140,044, being made up principally of fish, sugar, fruit and vegetables. Receipts of flaxseed totaled $603,898. Metals and ores to the value of $481,389 were imported last year. These were largely spiegeleisen, ferrosilicon and pig iron.

Cargoes also are shipped directly to Chicago after being transferred from ocean vessels at New Orleans to barges using the Mississippi river and the new Illinois waterway. These barges generally unload at the Inland Waterways Corp. terminal on the Chicago river at Western avenue and Twenty-ninth street. Various terminals are used for discharging cargoes received via Lake Michigan, the principal ones on the lake-front being the Navy pier and two other piers at the mouth of the river.

## Shipbuilding

(*Continued from Page* 34)

each and upwards, 16 were sent down the ways in 1934, as against only 4 in 1933.

A marked increase was shown last year in the building of ships fitted with steam turbines, these vessels aggregating 169,967 gross tons, compared with 19,090 tons in 1933. Launchings of ships fitted with a combination of reciprocating engines and turbines, during 1934, totaled 37,740 tons, as against 11,358 tons in 1933.

Launchings of vessels built on the Isherwood system of longitudinal framing, last year aggregated 71,381 gross tons, as compared with 46,351 tons in 1933.

The largest vessel launched in the world last year was the QUEEN MARY, built in Great Britain and Ireland.

Numerous changes occurred in the ship production ranking during last year. The lead in the volume of tonnage launched was retained by Great Britain and Ireland, who have held it continuously since they displaced the United States in 1921; and Japan is again in second place. In 1933, Japan launched 58,000 gross tons less than Great Britain and Ireland, but last year the gap was widened to 307,000 tons.

The United States, which stood tenth in 1933, has advanced to eighth. The contrast in the volume of tonnage launched by the various countries during the last two years is shown as follows:

| | 1934 | 1933 |
|---|---|---|
| Great Britain and Ireland.. | 459,877 | 133,115 |
| Japan | 162,420 | 74,290 |
| Germany | 73,733 | 42,195 |
| Denmark | 61,729 | 34,016 |
| Sweden | 49,542 | 60,860 |
| Holland | 46,905 | 35,899 |
| Italy | 26,638 | 16,560 |
| United States | 24,625 | 10,771 |
| Norway | 18,857 | 9,718 |
| Spain | 18,358 | 18,044 |
| France | 15,950 | 34,073 |

Great Britain and Ireland last year made a marked increase in their proportion of the world's launchings of merchant tonnage. As against only 27 per cent of the total construction in 1933, their share advanced to 47.5 per cent in 1934. In the same period the figure for the United States gained slightly, going from 2 per cent to 2½ per cent.

---

The Cunard White Star Ltd., and associated lines carried a total of 153,000 transatlantic passengers during 1934 which was an increase of 51,000 passengers over 1933.

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# Marine Review

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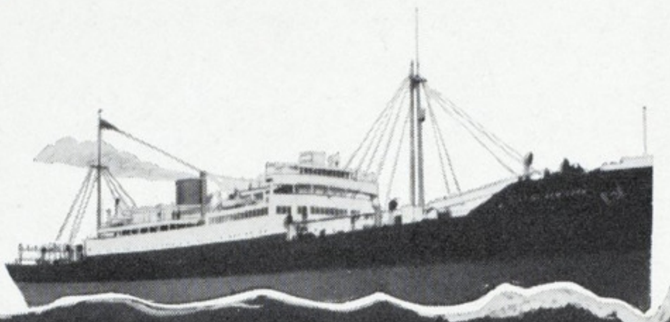
*The National Publication Covering the Business of Transportation by Water*

Charles H. West—Snagboat

March 1935

# SUN SHIPS



Passenger Ships—Cargo Ships

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## SUN SHIPBUILDING & DRY DOCK CO.

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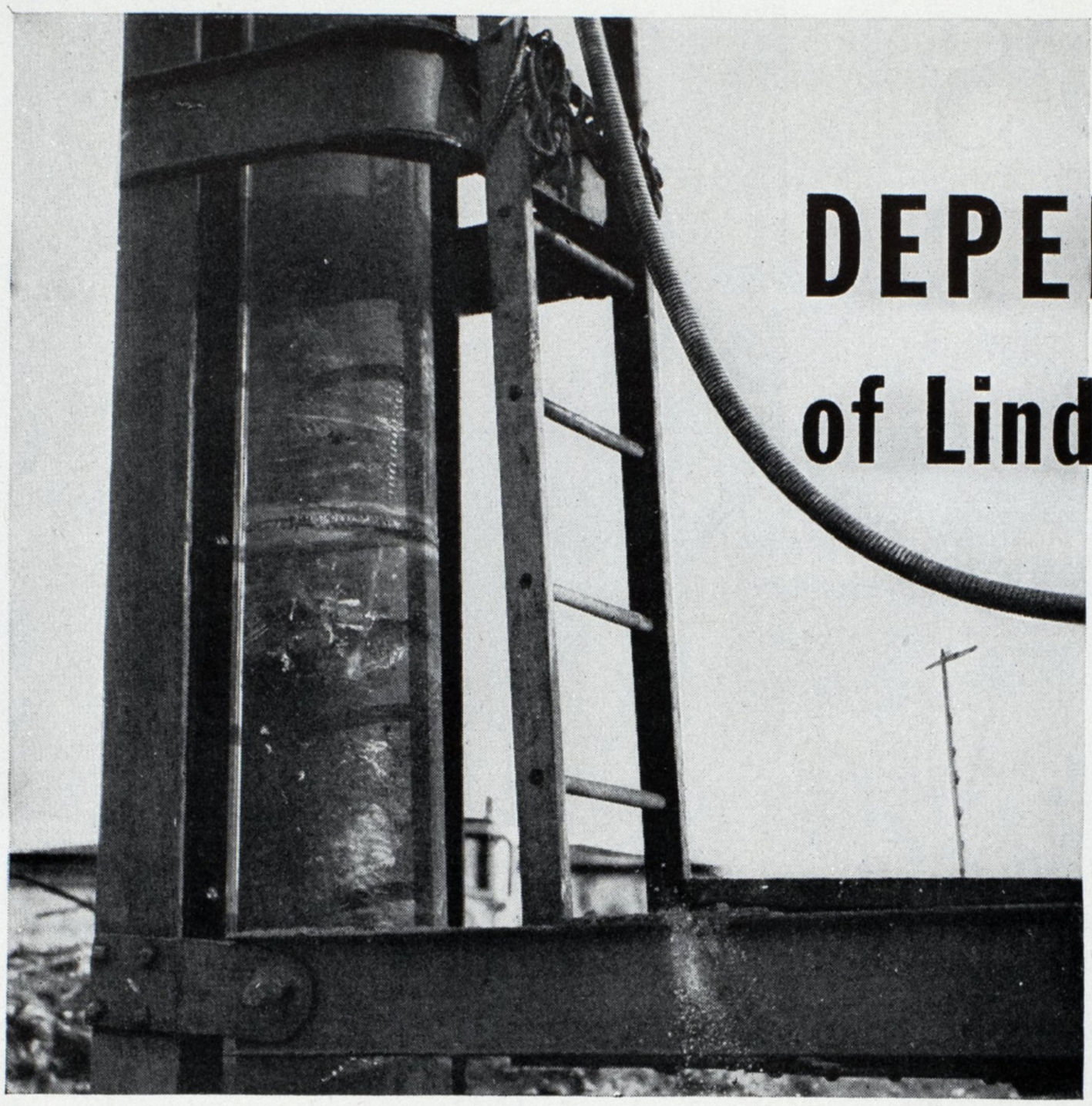
# Linde Process Service proves the DEPENDABILITY of Lindewelded Pipe for FIRM Foundations



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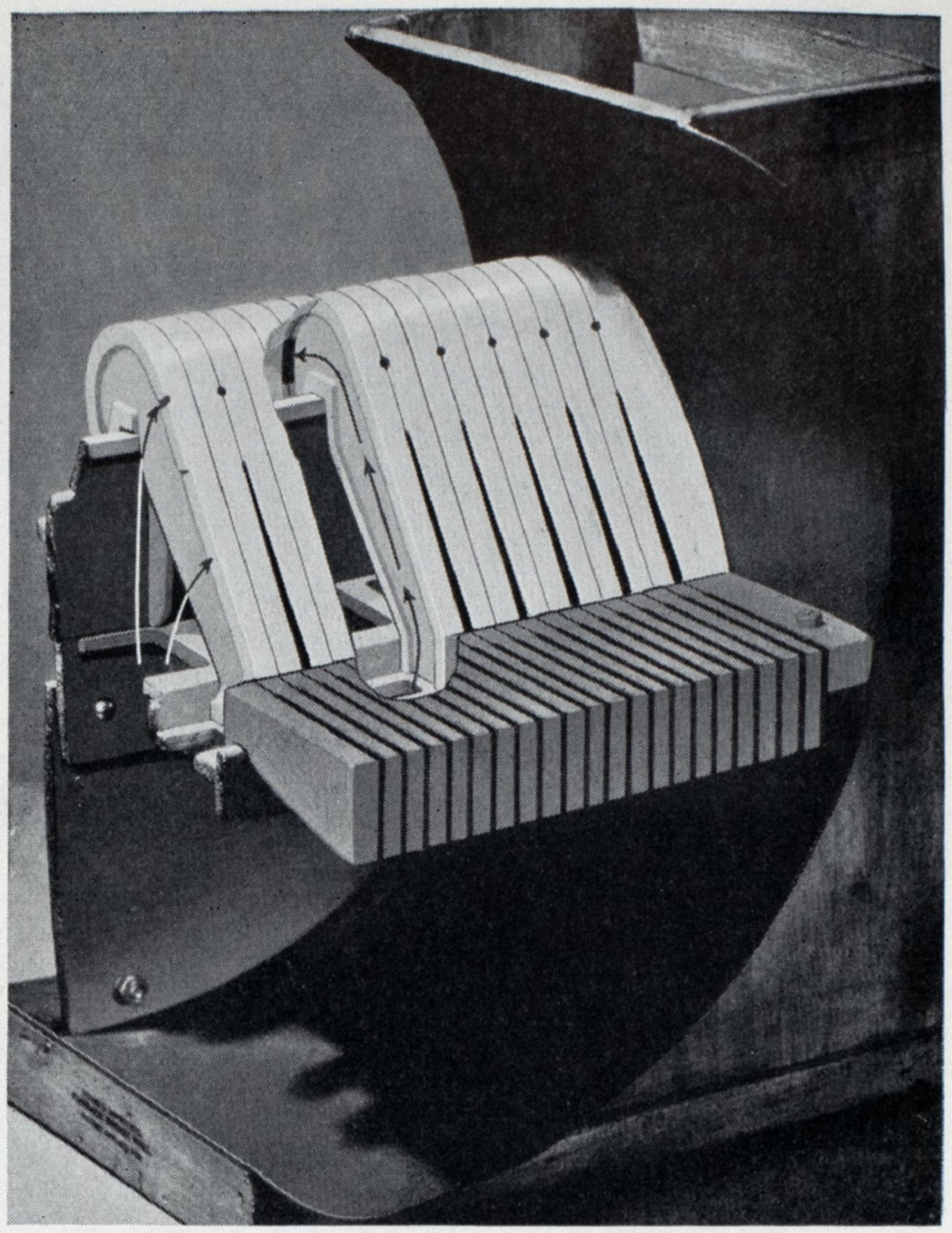

*This sectional model lets customers see instantly the features of this new bridge wall. The photo has been retouched to bring out the air channels. Arrows indicate the flow of air.*

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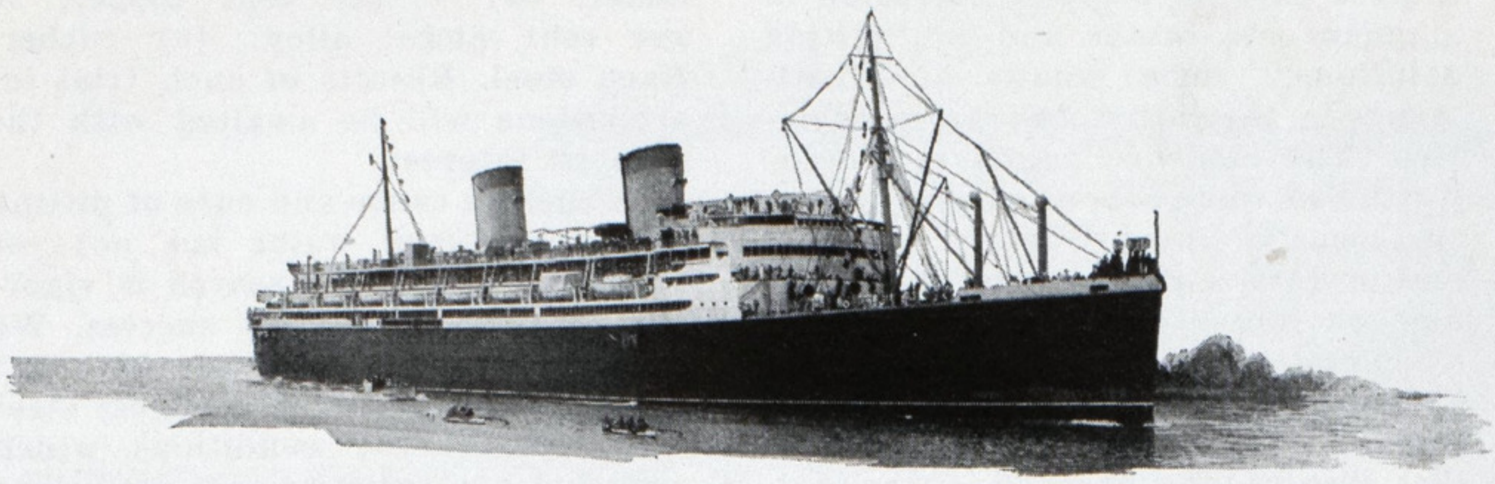
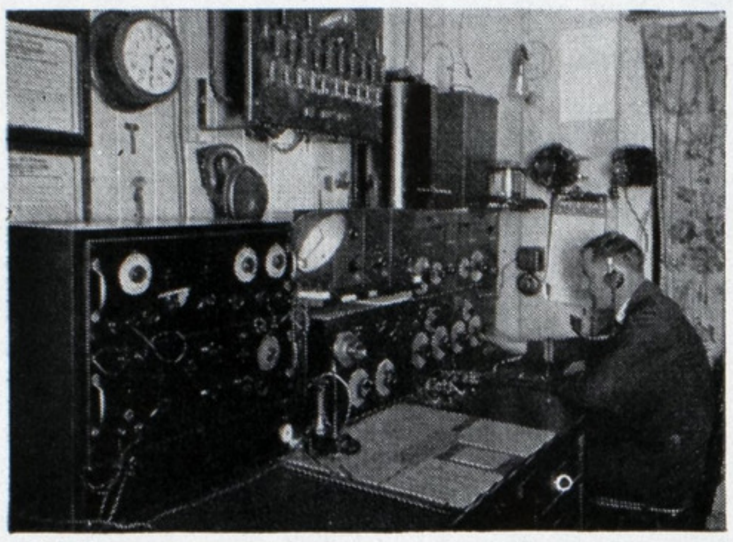
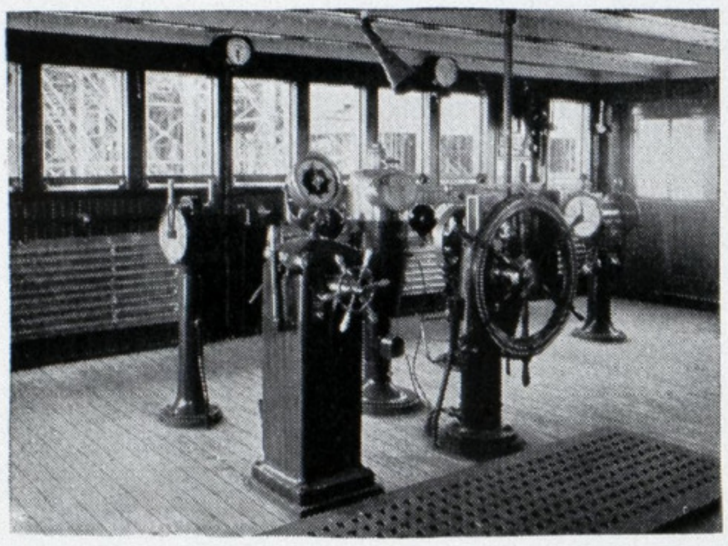
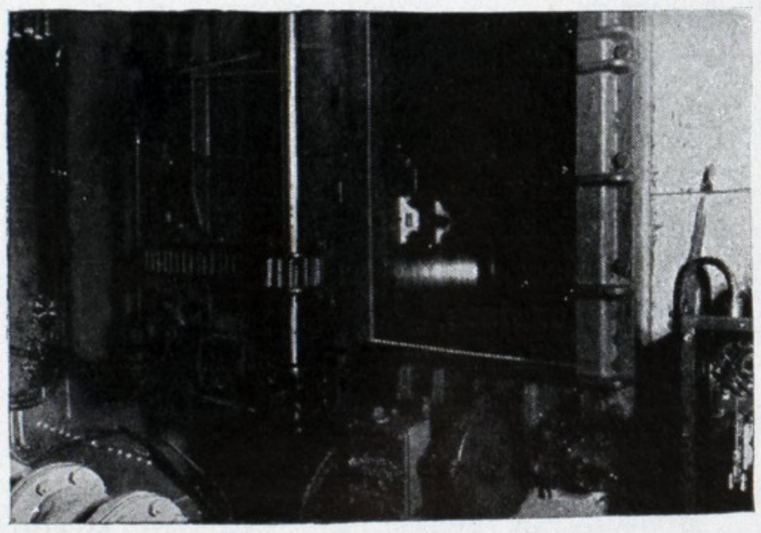




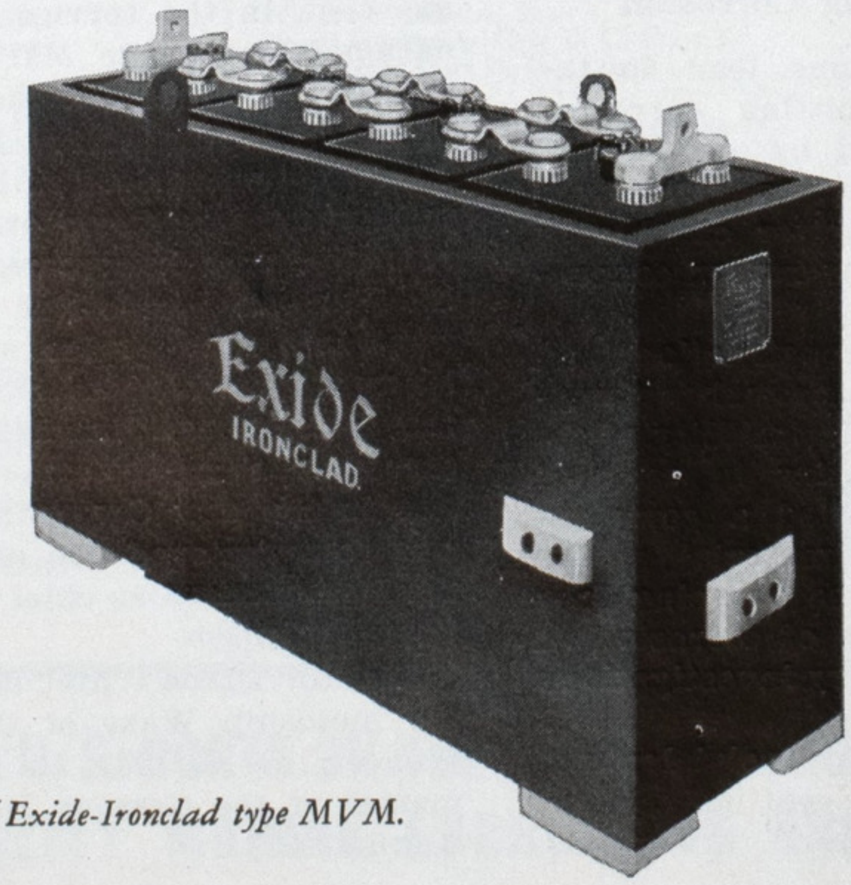
*Wireless*



*Navigation equipment*



*Bulkhead doors*




*A 4-cell tray of Exide-Ironclad type MVM.*

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Exide-Ironclad Marine Batteries are an unfailing source of light and power—light for an entire ship—power for bulkhead doors, for compass, electric steering, wireless equipment and other auxiliaries.

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## MARINE BATTERIES
### WITH EXIDE MIPOR SEPARATORS

"MIPOR," Reg. U. S. Pat. Off.

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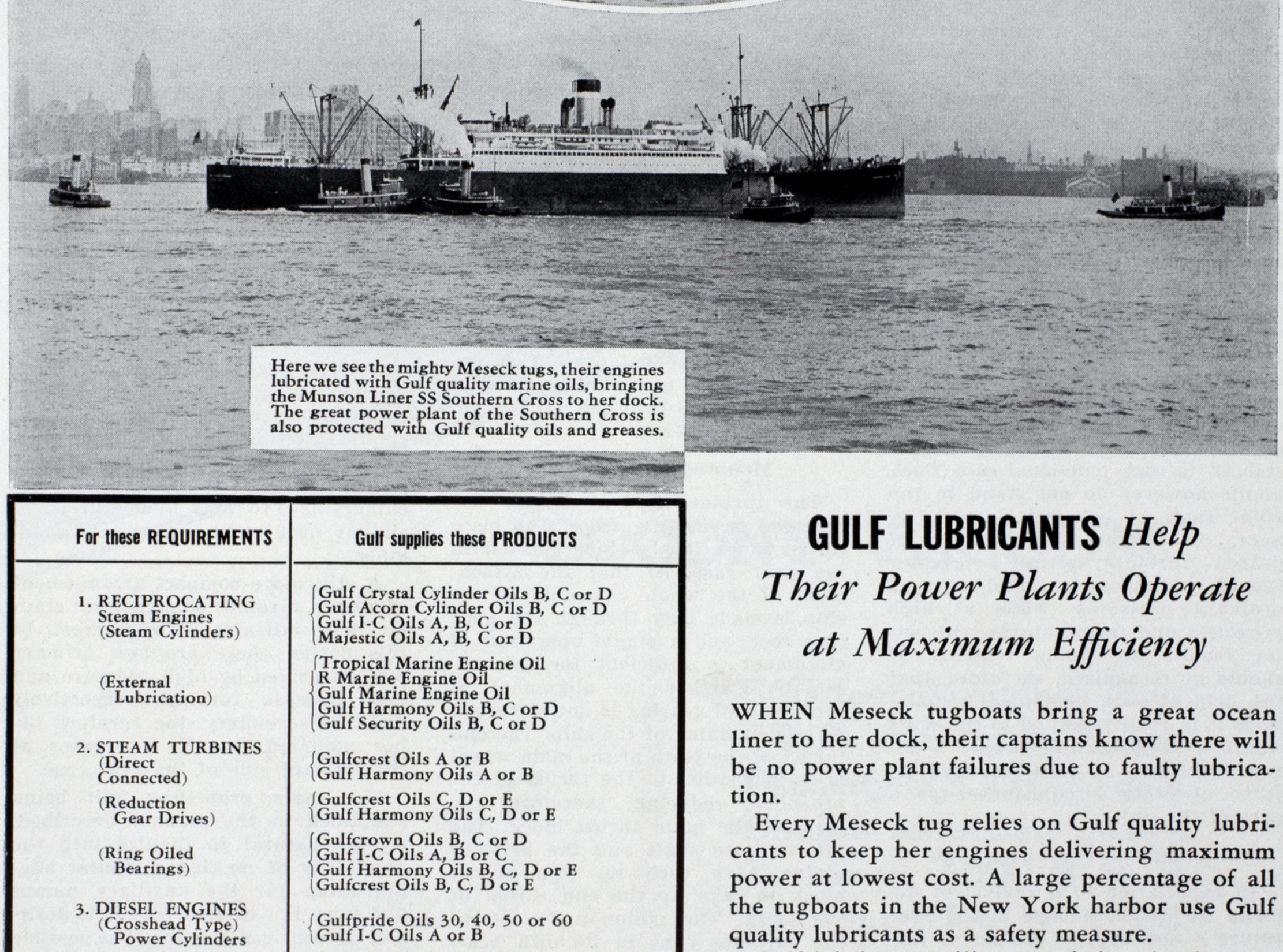

Here we see the mighty Meseck tugs, their engines lubricated with Gulf quality marine oils, bringing the Munson Liner SS Southern Cross to her dock. The great power plant of the Southern Cross is also protected with Gulf quality oils and greases.

| For these REQUIREMENTS | Gulf supplies these PRODUCTS |
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| (External Lubrication) | Tropical Marine Engine Oil<br>R Marine Engine Oil<br>Gulf Marine Engine Oil<br>Gulf Harmony Oils B, C or D<br>Gulf Security Oils B, C or D |
| 2. STEAM TURBINES (Direct Connected) | Gulfcrest Oils A or B<br>Gulf Harmony Oils A or B |
| (Reduction Gear Drives) | Gulfcrest Oils C, D or E<br>Gulf Harmony Oils C, D or E |
| (Ring Oiled Bearings) | Gulfcrown Oils B, C or D<br>Gulf I-C Oils A, B or C<br>Gulf Harmony Oils B, C, D or E<br>Gulfcrest Oils B, C, D or E |
| 3. DIESEL ENGINES (Crosshead Type) Power Cylinders | Gulfpride Oils 30, 40, 50 or 60<br>Gulf I-C Oils A or B |
| Bearings | Gulfcrest Oil E<br>Gulf Harmony Oil E |
| (Trunk Piston Type) | Gulfpride Oil Winter, 30, 40 or 50<br>Gulf Parvis Oil M, H, A or B |
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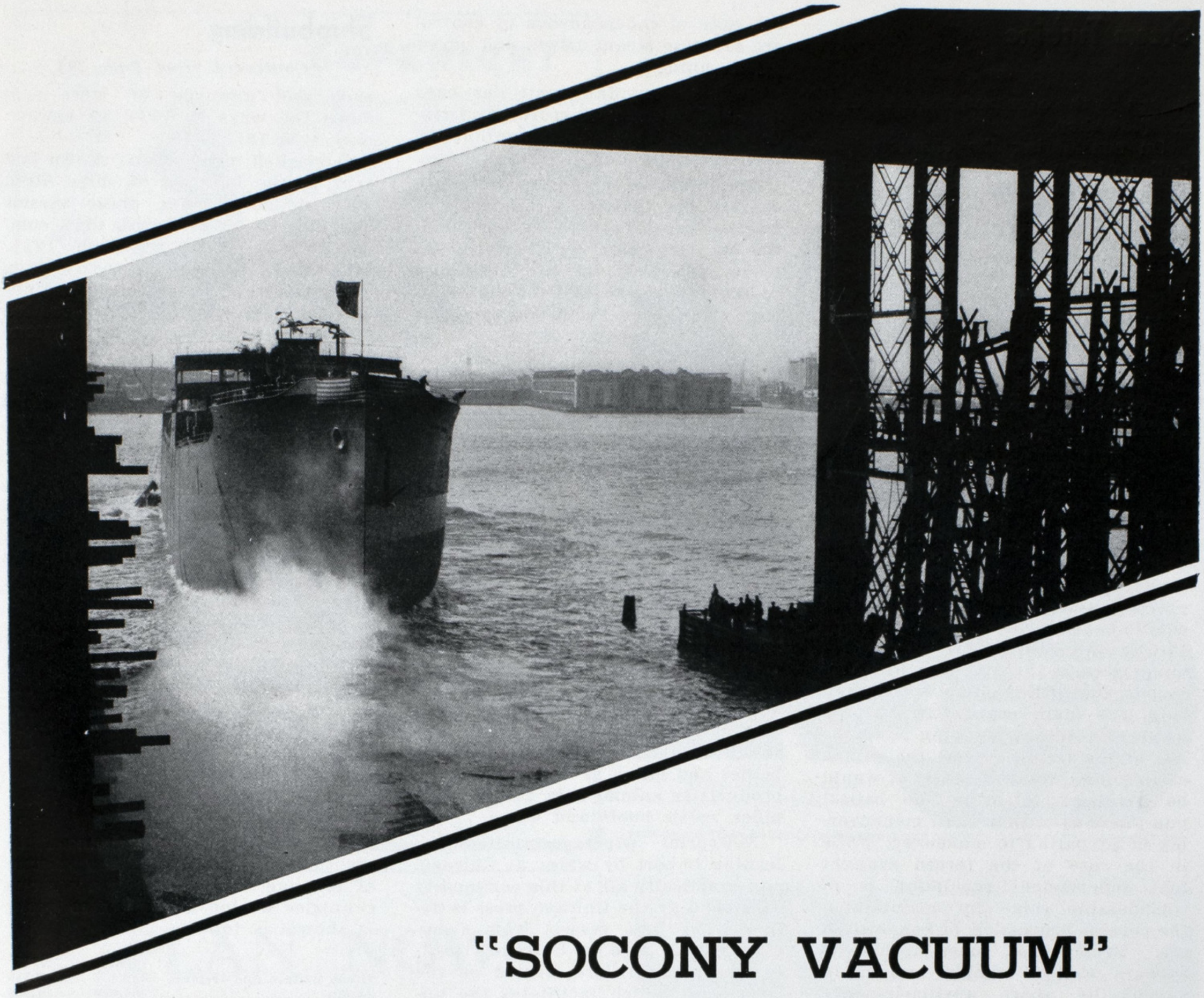

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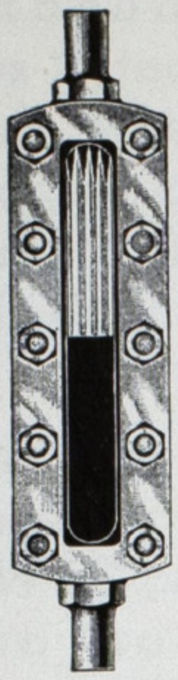

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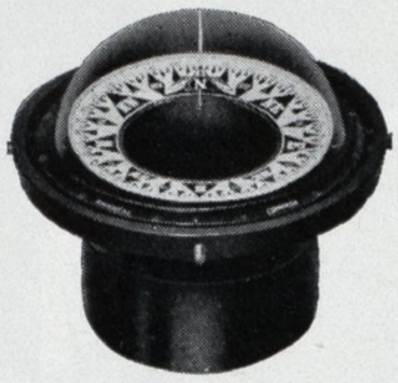

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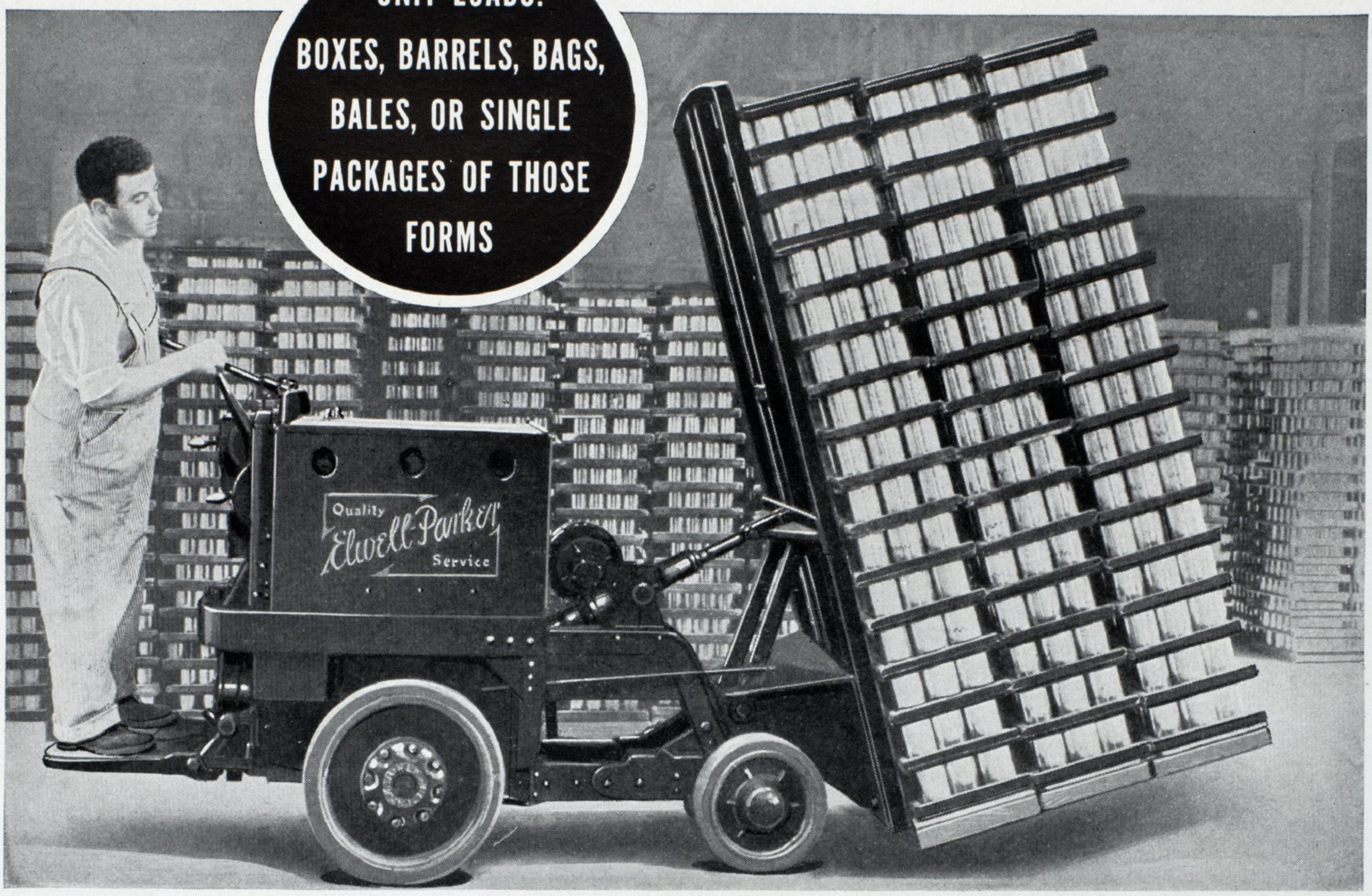


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